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MOTOR AGE

Volume XXXV
Number 5

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, JANUARY 30, 1919

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Three Dollars a Year

Note the Interest Being Shown in the Essex

THE way the public has taken to the new Essex is remindful of the early days of the automobile.

Everyone is more or less familiar with all other cars.

The Essex is the only new one either in type, price, class or name. Motorists have talked of it for more than a year. Now that it is being shown in all parts of the country, you have an opportunity to see the interest it has awakened.

Essex dealers are getting more prospects in their stores than they have had in months.

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(B)

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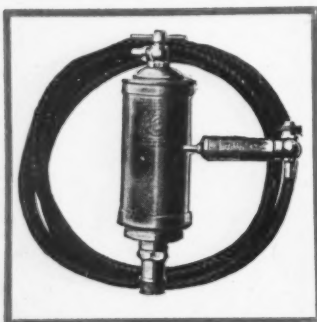
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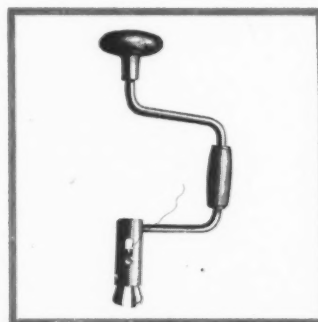
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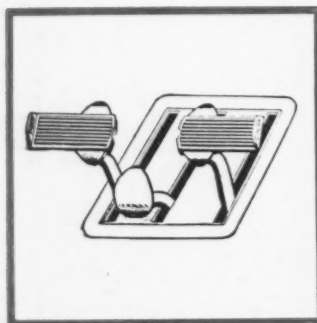
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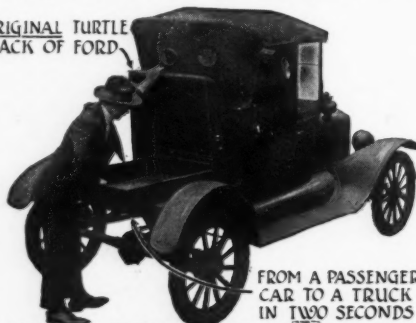


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CAR TO A TRUCK
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For Fords. Price \$38.50



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MOTOR AGE

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No. 5

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MOTOR AGE

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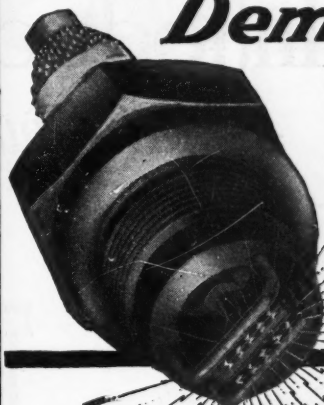
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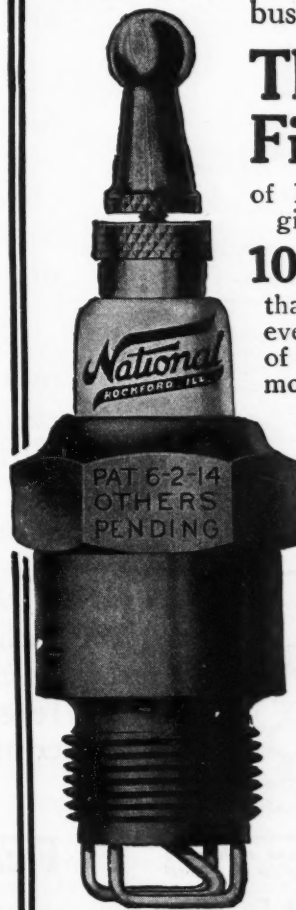
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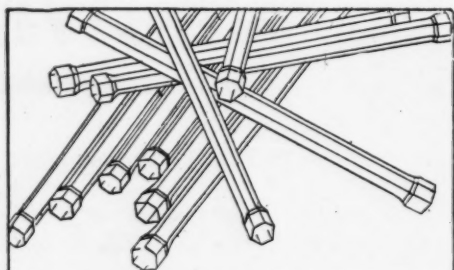
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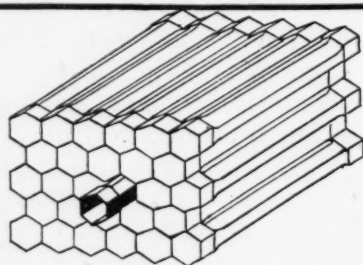
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BERGIE NATIONAL SPARK PLUG CO.
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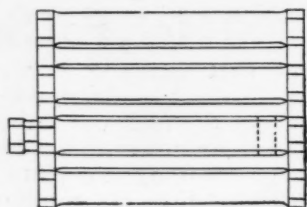
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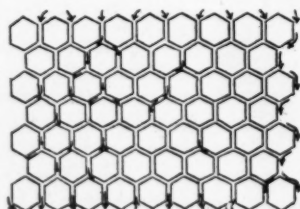
The core is composed of a plurality of individual tubes placed in a horizontal position.



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Top view, showing how any tubes may be extracted and replaced without disturbing the others.



Water passes completely around each tube; all cooling surfaces come into direct contact with the water.

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FEDDERS MFG. CO., Inc.
Buffalo, N. Y.

MOTOR AGE



A general view of the Coliseum this year shows as brilliant a display as in former years

A Home Affair But National

**Chicago's Nineteenth Annual Show Opens With More
Promise than Preceding Events Even**

CHICAGO, Jan. 25—Chicago's first strictly home affair in the form of a motor car exhibition opened last night upon a display of cars and accessories and with an attendance, decorations and every other aspect of a national show. Billed as the Nineteenth Annual Automobile Show, there is nothing to distinguish it in appearance from the previous exhibitions staged by the national organization.

That the present exhibition lives up in style and in prospects for a generous busi-

By Darwin S. Hatch

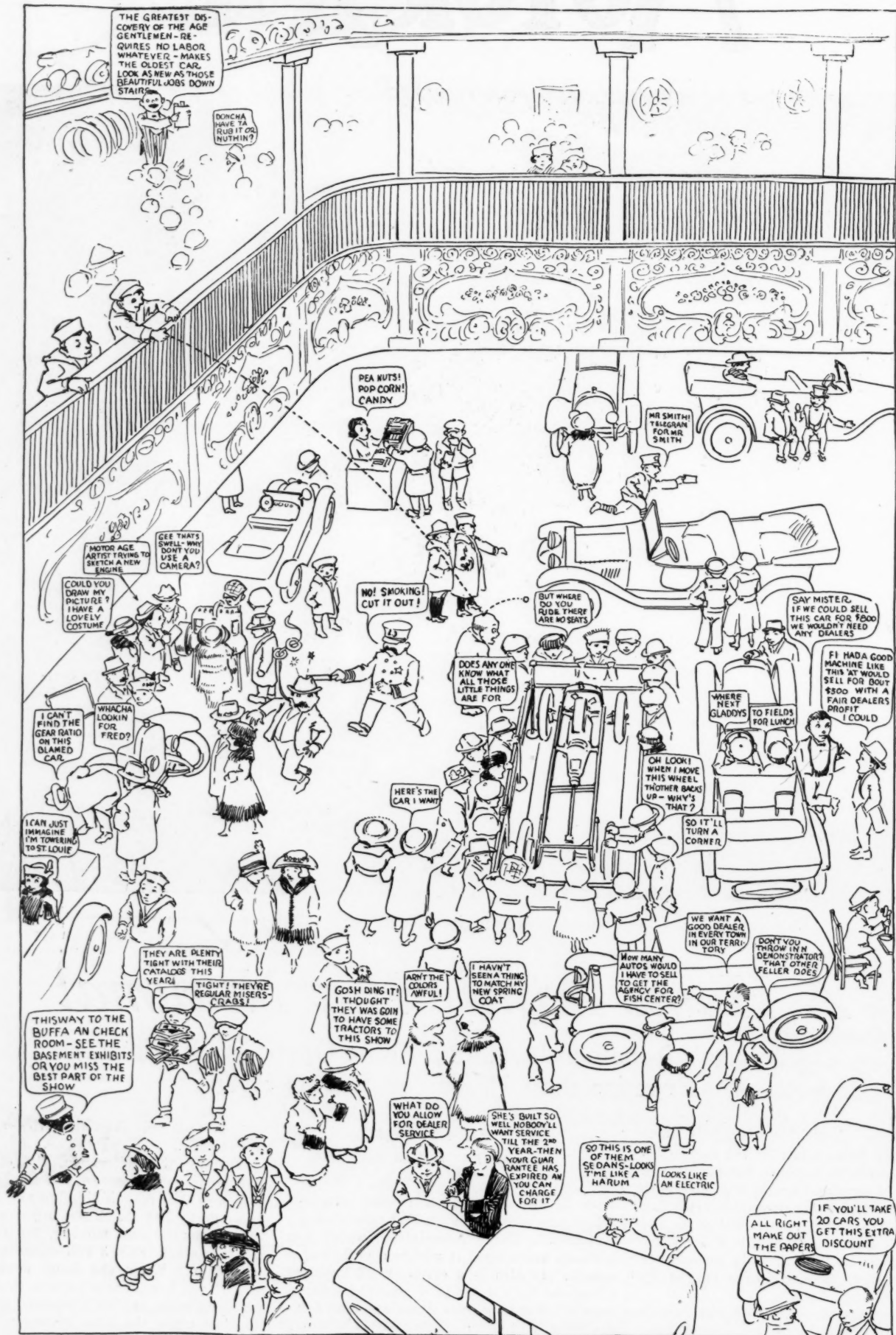
Managing Editor Motor Age

ness to the eighteenth annual displays which preceded it is a credit to the Chicago Automobile Trade Association, which has planned and staged it within a period of a month. It also is a criterion of business prospects for the trade during the coming season. Not only does it indicate the dealers are alive to their opportunities but that

the public is reawakening to the call of the motor car.

Opening this afternoon, the exhibition will be closed to-morrow, but the passenger car show will reopen Monday and continue through to Feb. 1. Then, after a day of rearrangement and moving, the truck exhibition starts Feb. 3 and extends through to Feb. 6. When the doors were opened at 2 o'clock hundreds of persons were awaiting admission at the Coliseum door, and late last night the show management gave

A Corner in the Coliseum at Chicago's Nineteenth Annual Show



out an estimate that 30,000 persons had visited the show. This is a very good attendance for the first day and presages well for the total attendance throughout the week.

Manager Sam Miles, who has been connected with every national motor car show staged in Chicago, announced himself as satisfied with the opening day, with the interest shown by the crowd and with the prospects for the week.

As in the past, the Coliseum, Annex and the First Regiment Armory are filled on their lower floors with cars and on their upper floors with accessories. At the time of opening, there was but one blank space, and this was that of a car concern which had not succeeded in getting anything but an engine into its exhibit. This will be filled tomorrow. Last year's difficulties in getting exhibits into place, caused by the railroad tieup, the fuel situation and inclement weather, are not present this year.

Fine Weather Here

Consequently, not only are the exhibits practically all in place, but the fine weather brought out an attendance that would not have been possible otherwise. The opening was signalized by an address this evening by Frank I. Bennett, state director of public works and buildings, representing Governor Lowden. Mr. Bennett assured his auditors that the state was going ahead with the good roads movement and expects to have active construction started as soon as weather permits. He made a plea for co-operation of the dealers in getting the right kind of regulations and laws passed, preventing the use of the highways with excessive loads. He pointed out that there was no use in building good roads unless they can be kept in condition and that the first step is the regulation of traffic that passes over them. He announced that the secretary of state expects a registration of 450,000 for 1919 in Illinois, and Mr. Bennett said that there was market for at least 50,000 new cars in Illinois this year.

The whole show is concentrated in the Coliseum and Armory. There are no outside shows, so far. In other years, the hotels usually have had exhibitions which could not or would not go into the show proper. Of course, the dealers along the row have dolled up their places for the show week visitors. Mitchell's new model, which will not arrive until Tuesday, probably will have to be shown at the salesroom instead of at the Coliseum, as intended. Packard has a Liberty engine in full working order on exhibition at the branch headquarters. Erwin Greer is running a second-hand car salesroom in the Greer building that used to serve as an overflow for the Annex next door.

From the standpoint of the number of exhibitors, the present show almost equals that of last year. There are to-day sixty-eight car makes exhibited as against seventy-nine last year, and 135 accessory exhibitors, against 126 of last year.

One of the questions to be settled by the show is whether or not the dealers from other territories will come to New York and Chicago shows as in the past, now that they no longer are staged by the manufacturers. It seems certain that the manufacturers themselves will be very largely on hand before the week is over. Even the first day saw a goodly number of big men from the factories building passenger cars, and the accessories and parts men are bound to be here because they are holding their annual meeting and banquet in Chicago during show week.

It is too early yet to determine whether the representation of dealers from all parts of the country will compare with last year. In fact, it is hardly to be expected that such will be the case. Nevertheless, the factory men are of the opinion that the latter part of the week will see great numbers of out-of-town dealers who will stay over for a part of the truck show. More than ever before, the dealers are interested in trucks as well as in cars, and they probably will plan their visit so that they can take in the most exhibits. There is a pos-

sibility, also, that many of them will endeavor to take in the latter part of the Chicago exhibition and the early part of the New York show.

Soon after the show opened yesterday the annual first sale was reported by four different concerns. Among those who have claimed to merit the distinction of selling the first car are Charles H. Foster, of Cadillac; O. C. Hafflinger, of Jordan; C. S. Riemann, of Elgin, and Harry E. Daniels, of Dort.

Nineteen hundred and nineteen and the show season is the most important period that has come in the history of the dealer fraternity. In many respects the dealers have come into their own, into a bigger share in the doings of the trade.

The two big shows, still "national," are run by dealers, the National Automobile Dealers' Association is stepping into its greatest year. It is to hold to-morrow and Wednesday its first big annual meeting. At this time it will be addressed by leaders from the factories, such men as John Willys, Ned Jordan and George Graham. The N. A. D. A. has made itself a factor and its meeting at the LaSalle is one of the big events of show week.

All the Glamour Here

As an exhibition, the present show has all the glamour of its predecessors. The same elaborate decorations and lighting effects are carried out in the Coliseum and Armory as in the past. The decorations are necessarily on a gigantic scale but softer in tone than in recent years. The main canvas forms the ceiling with its scroll effects of purple and gold. In the south end is a transparency representing the Goddess of Peace receiving Industry and at the north end, Peace representing the motor car to the world. Thirty-two pillars, each 23 ft. high, are placed on the floor of the Coliseum, and sixteen in the Armory. The Annex decorations are in Japanese effect.

A view of the individual exhibits gives one the impression that the present show is



The accessory exhibits were there in full force, also. This is a glance in the Coliseum balconies



This view of the Armory takes in many concerns which hitherto have selected the salon as display place

a more practical one than in the past. There is less gilt paint and silk about the cars and more real cars. With perhaps one or two exceptions, there is not a car on exhibition which would not appeal to the buyer as practical. This absence of special show cars perhaps may take away a little from the gaping attention of the sightseers, but it is an improvement from the standpoint of a business proposition. Some of the spectacular features of previous years are absent. There is no gold chassis and no hand painted interiors, and, by the same token, there are no cars so delicate that the public has to be barred out by silk ribbons. Every car there is capable of being sat in and at least looks as though it could be driven.

Magnet to Attract Buyers

Perhaps it is just as well that the factories did not have the opportunity or time to prepare the special show jobs to serve more as a magnet for the sightseer than a rouser of buying impulse. Nevertheless, it is not to be thought that there is not on display a good number of special educational exhibits. The Paige split chassis, which has been a feature of exhibits of this car for years, still offers a fine first-hand object lesson in chassis construction. This is a complete chassis split from end to end through radiator, engine, clutch, gearset, propeller and differential. Likewise, there are several chassis with parts cut away to show how they operate and run by electric motors. Also, there are several engines with cylinders and waterjackets cut away to show piston and valve action. In the electric car exhibit was included a partially built aluminum body showing this construction.

If the cars to be seen at the show are criterions, we shall have fewer of the black bodies than in the past. The exhibit as a whole was more colorful and, in most instances, the colors were stock. Of a total of 245 cars, only fifty were black or really dark blues and greens. All the rest were in lighter colors, running from white and

cream color through all the shade combinations.

As might be expected in a show of as practical a tone as this one, touring cars were far and away ahead of any other body styles in number. There were 116 of these, and, quite as logically, the inclosed family car, the sedan, came second. There were forty sedans and twenty-nine coupes. Sporting roadsters and touring cars, as well as the more special types of inclosed cars, made up the rest of the number. Four-passenger roadsters were not on view in as great numbers as formerly.

The super-abundance of touring cars perhaps is due in great measure to the fact that these are the types which naturally are first put in production by the factories, and there has not been time, since the cessation of war work, to develop and build the less quickly-produced closed cars.

The armory, for the first time in its history, has taken on somewhat the aspect of a salon. There is no salon this year at the Congress, where in previous years have been exhibited many of the higher class cars, custom bodies, etc. Many of these are in the Armory, and the level of the exhibits there has been considerably elevated. Some of the notable cars which have been Salon exhibitors in the past and which are now at the Armory are Fiat, Locomobile, Owen-Magnetic, Cunningham, Roamer and Biddle. The Graff Body-Building Co. also has an exhibit.

The White Co., which has been a salon exhibitor the past few years, is not represented at the show, because there has not been time at the show since its war work ceased to get the new cars ready. There is, however, one car on exhibition which had not appeared at a Chicago show since the time of the Selden patent fight. This is the Ford, which makes its debut with electric starter on the closed cars. Needless to say, there is always a crowd around the Ford booth. The popularity of the car, the fact that it is exhibited for the first time in a show of national scope and that it has

this time more new features, makes it something of a magnet for the populace.

Some of the special bodies and painting jobs included a very sporty and speedy Velie roadster with exposed exhaust manifold, a Kissel roadster of sporty type in canary yellow, a Hudson limousine which has especially graceful lines and is painted in Nile green. The latter has square pillar lamps with ventilators on the hood and the rail on the top. Another of the Kissel cars had a special custom body, upholstered in flowered velour. One of the Daniels cars was a big club tourist, without running-board, which carried a golf bag on the special holder attached to the windshield. A Biddle sedan, with a windshield of the V-type, squared off at the outer edge, has a special body that carried out the novel angular effect. A Winton suburban brougham in a soft green, which the dealer called sea foam shade, gives an effect of unusual size and strength.

Some of the special body jobs were ordered, and some were made by the dealers themselves. The Winton branch manager had the new suburban brougham body fitted to a standard Winton chassis. This was rushed through to be ready for the show. The casual visitor, seeing it, thinks he sees a new Winton design, which is just the point desired.

Truck Bodies Shown

There was only one exhibit which smacked of the commercial vehicle, and that was a special showing of truck bodies by the Parry Mfg. Co.

The accessory exhibits are there in full sway, but there are very few new accessories. The accessory maker also has been busy with war work, in many cases to the full extent, putting 100 per cent plant facilities on Government contracts. But the interest is bigger, if anything, than ever, and the exhibitor, from every indication, will find himself well repaid for any efforts he may have made to help bring the show to the high point of success it has.

Milwaukee Stages Twelfth Annual

Wisconsin and Upper Michigan Dealers and Distributers Gather for Exhibition and Meetings

MILWAUKEE, Wis., Jan. 25—The predominating thought induced by inspection of Milwaukee's twelfth annual show, after the impression of magnitude and magnificence has been absorbed, is that within sixty days after a year's plans had virtually been abandoned because of the war, it should be possible to present so comprehensive an exposition, such completeness of detail and so thorough a dealer-consumer attraction as that continued in the Auditorium. It is difficult to comprehend that all this has been achieved despite the fact that the war has been over only since Nov. 11.

The show opened last night and will run until Jan. 30. The show again is designed to attract the consumer and the dealer as well. It forms the concentrated efforts of the Milwaukee distributor and dealer trade to stimulate the new year's business among the public and at the same time renew or make new connections with retail dealers throughout the Wisconsin and Upper Michigan territory, which in general is the field of Milwaukee distributors. It is not only the mecca of thousands of car owners and prospective owners in nearly every section of Wisconsin but of the dealers in the same sections. Since the distributors of Milwaukee as a rule are the dealers in Milwaukee city and county the combination of a show appealing both to consumers and dealers is an ideal one. To carry it out successfully is the big achievement of the Milwaukee Automobile Dealers, Inc., which is staging this show as it has practically all the Milwaukee shows held since 1908. The M. A. D. is composed of thirty-nine members, practically every one a distributor of passenger and commercial cars in the Wisconsin-Upper Michigan territory and dealer in Milwaukee and immediate vicinity.

Provision always has been made to entertain the thousands of visitors with music, motion picture performances, style shows and other attractions to supplement the exposition proper. In recent years cognizance has been taken of the needs of the dealers who come here by entering them specially on one or two nights of show week. This year, however, the dealer is coming in for much more attention, largely because the post-war situation is such that the Wisconsin dealer organization is in process of reconstruction from the damage done by the war and is being given a vigorous tonic.

Afternoons to Dealers

The afternoons of two days are being devoted to the dealers. Wednesday, the first session of the sales congress will be held in one of the halls of the Auditorium not used for the show proper. At this session the principal speaker will be E. Leroy Pelletier, Reo Motor Co., who will discuss, "Why Do We Advertise?" F. A. Cannon, executive secretary of the Wisconsin Good Roads Association, will speak on "Wide Sleigh Legislation" and the desirability of retaining the present Wisconsin wide-

sleigh law, which is being attacked by strong opposition. A round table on selling motor cars will follow.

Thursday afternoon, C. A. Brownell, Ford Motor Co., will talk on "Does Advertising Bring Results?" Charles W. Nash, president Nash Motors Co., Kenosha, Wis., is scheduled to speak on "Selling." The Firestone Tire & Rubber Co., Akron, Ohio, will present a motion picture illustrating "Co-operating With the Advertising Department."

There are on exhibition at this year's show forty-three makes of passenger cars and thirty-six commercial cars. There are thirty-six exhibitors in the passenger car department, thirty-three in the truck division and thirty in the tire, accessory and supply department, which with several other displays makes a total list of 110 exhibitors.

The following makes of passenger cars are on display: Packard, Peerless, Studebaker, Overland, Willys-Knight, Oldsmobile, Lexington, Allen, Nash, Oakland, Reo, Paige, Winton, Chandler, Mitchell, Cadillac, Hudson, Essex, Maxwell, Cole, Briscoe, Ford, Dodge Brothers, Kissel, Buick, Chevrolet, Dort, Paterson, Westcott, Stanley, Hupmobile, Haynes, Locomobile, Franklin, Marmon, Saxon, Case, Apperson, Crow-Elkhart, Elcar, Olympian and the Detroit and Rauch & Lang electrics.

Other displays include those of the Parker, Sterling, Packard, Stewart, Available, Rainier, Nash, Titan, Defiance, Riker, Menominee, Atterbury, Oldsmobile, Republic,

Studebaker, Diamond T, Service, Garford, Reo, Chevrolet, Oneida, I. H. C., Ford, Kissel, Fulton, Federal, Clydesdale, Dodge Brothers, Master, Duplex-F. W. D., Fordson tractor, Parrett tractor, Troy Trailer, Horizontal Hydraulic hoist, Sewell Cushion wheel.

A Curtiss airplane is exhibited by George W. Browne, Wisconsin distributor of the Overland, who recently was appointed distributor of the Curtiss. Two Liberty engines, one by Packard and the other by Ford, flank the airplane, which is displayed on the stage of the Auditorium. The only new make of car exhibited is the Essex.

Instead of being spread all over the first floor of the Auditorium, this year's show is compact and unusually easy of access, by a new arrangement which provides a great deal more floor space than the old system. Since the last show the alley-like basement of the Auditorium has been completely excavated and made into an exhibition hall even larger in size than the main arena directly above it. In addition to the entrances leading from the arena to the basement at the ends of the building, there is a grand staircase in the center of the arena floor. In former years the various halls on the main floor were used for displays, but since the new basement is provided the halls are available for meetings and gatherings. The accessory, tire and supply exhibits occupy booths running around the main floor lobby.

The first night attendance was more than 8000.

Hartford Exhibition an Agricultural Show

Hartford, Conn., Jan. 25—Hartford has a tractor show this week but it is more of an agricultural show than a tractor show. In all five tractors were exhibited, and the show did not seem to attract a great deal of attention. As a matter of fact, Hartford dealers are not very keen about tractor possibilities in the Nutmeg State or in that section of the state which they cover. They point out that tobacco farming is the principal industry and inasmuch as a man who grows 20 acres of tobacco is considered to be a fairly large farmer, the farms are not exactly suited for tractor plowing and cultivating. Topographically, though some sections of Connecticut are adapted for the use of tractors, the country for 10 miles either side of the Connecticut river is comparatively stony, and dealers report that the farmers are so poor that they could not afford tractors even if they could use them.

Some dealers who have tried their distribution have found it possible to sell a limited number but the opinion appears general that it would be almost impossible to reach sufficient volume to warrant the investment and the effort.

All this, of course, applies to the three Hartford counties which the average dealer

covers with cars and tractors, these being Hartford, Tolland and Litchfield. One large distributor that covers these three counties and Middlesex, Windham and New London in addition states that the same conditions obtain there as well.

The machines on exhibition at the show were the Moline, which up to recently has been handled by the R. D. Britton Co., but which is not represented now in Hartford; the Cleveland, which is handled by C. S. Mersick & Co., New Haven; the Fordson, which is handled by the Elmer Automobile Co., Hartford, a direct Ford dealer but a subdealer under Flint of Providence for the Fordson; the Avery and the Beeman, handled by Bracket, Shaw & Flint of Boston. Only one farm lighting system was exhibited, this being the Delco light, handled by Thomas A. Stewart Co., Hartford.

SPOKANE SHOW A SUCCESS

Spokane, Wash., Jan. 24—Spokane's first progressive automotive show is over, and the sixty live-wire dealers of the chamber of commerce who put it over deserve credit. Each dealer arranged an instructive program in the various salesrooms, which were appropriately decorated.

The visitors this year were not the sight-seeing crowd of a year or so ago, because they knew there was really nothing new on account of the war having blocked the plans of manufacturers, but were instead highly interested in the various makes.

Though no attempt was made to take orders during the show, the dealers having decided upon that policy, scores of sales were made unsolicited. Practically every dealer had on display inclosed models, and this type of car attracted much favorable comment.

TOLEDO SHOW AUTOMOTIVE

Toledo, Ohio, Jan. 28—The show opened last night with every inch of available space sold and every dealer represented. Exhibitors, unable to reserve space on the main floor, occupied overflow space in the balcony. Over 250 cars, trucks and tractors were on display, representing sixty different makes of cars, twenty-five trucks and eight tractors. More people attended the opening night than any previous show. It is estimated that 3000 out-of-town dealers are in Toledo to attend the show. The tractor exhibit is not as complete as last year.

HARRISBURG SHOWS TRACTORS

Harrisburg, Pa., Jan. 24—The third annual tractor show opened here in the Emerson-Brantingham Building Tuesday, the same day that Governor Sproule, Pennsylvania's new executive took office. The sixtieth annual meeting of the Pennsylvania State Horticultural Association and the Farm Products Exhibit were also held at the same time, so that there was a great influx of farmers and visitors from all parts of the state, and the tractor show was crowded during the entire four days. Fourteen tractor exhibitors showed their machines on the floor, many of them showing two or three models, and besides these there were three truck exhibitors and one plow exhibitor.

TO FINANCE G. M. DEALERS

New York, Jan. 27—The General Motors Acceptance Corp. has been formed by the General Motors Corp. to assist car and truck dealers in financing their purchases. Paid in capital is \$2,000,000 and surplus is \$500,000. The stock was subscribed by W. C. Durant and his associates. Paul Fitzpatrick, formerly vice-president and director of the Continental Guaranty Corp., is vice-president and general manager of the new concern. J. A. Haskell is president and Alfred H. Swayne is vice-president and financial manager.

Although the primary purpose of the new company is to finance automotive transactions it is understood that the business in acceptances will be carried on in other directions, probably in connection with the various duPont enterprises, owing to the duPont interests being closely identified with those of the General Motors Corp.

NEW MITCHELL SIX

Chicago, Jan. 28—The new Victory model Mitchell on exhibition for the first time at the showrooms on Michigan avenue discloses practically a new car, there being something like 100 improvements. The

body lines have been improved by a bevel edge, while upholstery, top and other appointments are much superior to the pre-war light six. A thermostat now controls the temperature of water, intake gases and air. The new car has a 120-in. wheelbase and is powered with a 3¼ by 5-in. engine.

Some of the major improvements consist of a deeper frame, stronger rear axle, better brake layout and ball bearing steering gear. The new crankshaft shows 35 per cent increased tensile strength. The long cantilever springs of last year have been retained. The new model sells for \$1,475 and comes in a five-passenger touring and three-passenger roadster, both at the same price. The standard finish is green with black hood and fenders. Tires are 34 by 4.

BALTIMORE SHOW? SURE!

Baltimore, Md., Jan. 24—The Monumental City is going to have its annual show, and it will be held Feb. 18-22 at the Fifth Regiment armory. For many weeks it appeared that there would be no show, because the Government had commandeered the armory, but the consent of the Maryland Armory Commission and the government has been obtained for use of the building. The Baltimore Automobile Dealers' Association, Inc., and the Auto Club of Maryland will have charge of the show.

Now the show is going to be held it has resulted in increased activity on the part of many of the dealers. While most of the dealers have been optimistic throughout the war period the announcement to hold the show aroused those fellows who have been creeping along, and now the dealers of the city are pretty well awake to the job before them. Improvement has also come to the dealers through the return of many of their repairmen, and every shop in Baltimore is going just as hard as it possibly can to handle the business.

ASCOT STAGES RACE

Los Angeles, Cal., Jan. 27—Special telegram—The 1919 racing season opened here yesterday at Ascot Park before a crowd of 25,000. The event of the day was the

Victory sweepstakes for 100 miles won by Roscoe Sarles, driving a Roamer. Omar Toft finished second and Eddie Hearne, third.

The absence of such coast favorites as Cooper, Oldfield and Pullen seemed to make little difference in the enthusiasm of the crowd. The winner's time for the 100 miles was 82:52½, or 73.7 m.p.h. He made a non-stop run. The real battle was between Toft and Hearne for second place. Each seemed to have greater speed than Sarles, but mechanical trouble and tire changes kept them from overtaking him.

Elmore drove through the inside rail in a qualifying heat. His car somersaulted several times but he escaped with bruises. His mechanic suffered a broken collarbone. Pentecost also went through the rail in the seventh lap of the race. Each occurrence was spectacular and gave the crowd a thrill.

MONTREAL "ON AGAIN"

Montreal, Jan. 24—Although the local trade association has decided not to hold its annual show this year, Montreal is assured of its annual show under the same management of the last five annual shows. The show will be staged April 5-12 in the Victoria Rink. This building will give an exhibition space of 19,000 sq. ft. The entire profits will be given to the funds of the Montreal Soldiers Wives' League.

HARRISBURG SHOW PLANS

Harrisburg, Pa., Jan. 24—Harrisburg's ninth annual show will be the biggest and best ever held by the Harrisburg Motor Dealers' Association, according to the committee on arrangements. It has been decided to hold the show in the big Overland service building, March 15-22.

The forty-four members of the dealers' association, which is now virtually 100 per cent of the local trade, will reserve 30,000 ft. of floor space so that everything directly and indirectly connected with the motor industry will be on exhibition. J. Clyde Myton is manager.

Exhibitors at New York Show

PASSENGER CARS

Auburn	29	King	77-78
Baker	30	Lexington	55-56
Oakland	22	Locomobile	18
Chandler	8	Jordan	71-72
Buick	13	McFarlan	51
Chalmers	62-63	Empire	52
Dodge Brothers	23	Marmon	16
Crow	74	Maxwell	4
Oldsmobile	19	Moon	6
Cunningham	78-79	Mitchell	10
Davis	80	Owen-Magnetic	68
Cadillac	3	Liberty	69
Dort	33	Packard	14
Elgin	50	Paige	65-66
Cole	27	Stutz	21
Roamer	56-57	National	12
Franklin	64	Scripps-Booth	28
Vellie	31	Daniels	11
Buick	60	Reo	25-26
Pierce-Arrow	20	Saxon	73
Haynes	9	KisselKar	61
Hudson	500	Apperson	62
Hupmobile	54	Phianna	66
Nash	52	Phianna	67
Premier	53	Stearns	15
		Studebaker	1

Standard	58
Peerless	2
Westcott	59
Mercer	32
Willys-Overland	50
Winton	17

ACCESSORIES

A. B. C. Mfg. Co.	328-9
Acme Die-Casting Corp.	281-2
Alexander Mfg. Co., J.	213-14
American Bosch Magnetic Co.	299
American Hammered Ring Co.	438-9
American Pump & Tank Co.	374-5
American Taximeter Co.	206
American Traction Ring Co.	294
Anderson Electric Spec. Co.	217-19
Arrow Specialty Co.	232-3
Asbestos Textile Co.	301-B
Auto Pedal Pad Co.	207
Automatic Transmission Co.	204
Automobile Journal Pub. Co.	407-8
Barnes Foundry Co.	377-8
Bergie Nat'l Spark Plug Co.	431-2
Blue Ribbon Body Co.	352-5
Bridgers Co., J. D.	444-5
Buffalo Specialty Co.	307-8
Bull's Eye Rubber Co.	303-B
Brooks-Ostruk Co., Inc.	82
Carlisle Cord Tire Co.	295
Carrm Body Co.	86
Chadick-Delamater Corp.	283-4
Chase Co., L. C.	249
Chilton Co.	331-2
Class Journal Co.	320-1
Coe-Stapley Mfg. Corp.	337-8
Coffield Tire Protector Co.	325-6
Conserve Sales Co.	381-1
Copp Co., Inc., Geo. W.	366-70
Crew-Levick Co.	339-41
Carbon Destroyer Appl. Co.	460-61
Davis Chemical Co.	452-3
Derf Mfg. Co.	264-5
Detroit Pressed Steel Co.	256-9
Dixon Crucible Co., Jos.	296
Dorr Miller Differential Co.	268-9
Double Seal Ring Co.	393-6
Eastern Rubber Co.	323-4
Electric Storage Battery Co.	305-A-B
Ellis & Turrell.	303-C
Emco Mfg. Co.	417-18
Essenkay Products Co.	364-5
F. O. B. Mfg. Co.	448-9
Fan Muffler Co.	306-C
Fire Gun Mfg. Co.	228-9
W. Hampton de Fontaine.	226-7
Gastine Co.	301-C
Gates Rubber Co.	251-5
Gray & Davis, Inc.	242-5
Grundy Mfg. Corp.	240-1
Hamilton Corp.	419-20
Hartford, Inc., Edward V.	306-A-B
Hayes Wire Wheel Sales Corp.	222-5
Holbrook Co.	81
Houdaille Shock Absorber Co., Inc.	442-3
Houpt Machine Co.	384-7
Hygeia Distilled Water Co.	220-21
Ideal Tire & Rubber Co.	428-30
Inland Machine Works.	215-6
J. & D. Tire Co.	301-A
Kenilworth Mfg. Co.	342-3
Laidlaw Co.	250
General Electric Co.	507-9
Lubriko Co.	450-1
Lacharnay Carburetor	456-7
Lane Bros. Co.	203
George W. LeCompte Co.	202
Lowe Motor Supplies Co.	287-91
McCord Mfg. Co.	303-A
Paul M. Marko & Co.	391-2
Marlin-Rockwell Corp.	401-3
James Martin	262-3
Metal Stamping Co.	312-14
Arthur C. Mason.	230-1
Charles E. Miller.	208-12
Frank Miller Co.	356-7
Moto-Meter Co.	302-A
Motor	348-9
Motor Vehicle Pub. Co.	371-2

Motordom Publishing Co.	382-3
National Carbon Co., Inc.	309-11
National Chain Co.	246-8
Never Break Products Co.	424-5
Ohio Cities Gas Co.	358-9
Parko Sales Co.	426-7
A. J. Picard Co.	292-3
Plunkett Shock Absorber Co.	205
Poertner Motor Car Co.	304-A
Portland Cement Association.	415-16
William E. Pratt Mfg. Co.	388-90
Radium Dial Co.	305-C
Rich Mfg. Co.	409-10
George H. Rives Mfg. Co.	201
Rubber Preserving Co.	436-37
W. E. Pruden Hardware Co.	458-9
Schaap Auto Co.	298
Schade-Phelps Corp.	302-B-C
Scott Corp.	413-4
Shaw Tire Co.	260-1
Simmons Mfg. Co.	304-C
Simms Magnetic Co.	350-1
Star Rubber Co.	440-1
Story Rubber Co.	270-1
Stewart Auto School.	236-9
Taft, Pierce Mfg. Co.	272-7
M. Geo. Tigar Bearings Co.	226-7
Times Sq. Auto Supply Co.	333-6
Tonneau Shield Co.	278-80
Union Truck Co.	362-3
Universal Shock Eliminator.	297

Victor-Ford Transmission Mfrs.	360-1
Vacuum Oil Co.	315-19
Ralph Waldt	344-5
Wasco Heater	304-A-B
West Steel Casting Co.	285-6
Whittemore-Sim Co.	346-7

Late Additions

Davis Chemical Mfg. Co.	
Gassaway, F. S., Inc.	
General Electric Co.	
George E. La Vitas.	
Mechanical Belt Co.	
Osgood Lenz & Supply Co.	
Stokes Carburetor Co.	
Wheeler-Schebler Carburetor Co.	
Charles H. Belknap Co.	
Champion Spark Plug Co.	
General Utility Co.	
Visible Measure Gasoline Dispensary.	
N. Y. Electrical Lamp Co., Inc.	
Pruyn Bearing Co.	
A. Schrader's Son.	
Champion Ignition Co.	
B. F. S. Manufacturing Co.	
A. S. Campbell Co.	
K. R. Wilson.	
National Tool & Mfg. Co.	
H. B. Shonts Co., Inc.	
Carlson & Ackerman.	

Displays for Chicago Truck Week

TRUCKS

Acme	Coliseum K-1
Autocar	Coliseum B-5
Available	Annex O-3
Brockway	Coliseum F-5-6
Bethlehem	Coliseum E-3-4
Chevrolet	Coliseum C-4
Clydesdale	Coliseum E-1-2
Couple-Gear	Coliseum H-3
Dodge Brothers	Coliseum B-7
Dearborn	Coliseum A-1
Dorris	Coliseum G-2
Diamond T.	Coliseum F-1-2
F-W-D	Coliseum F-3-4
Federal	Coliseum A-6-7
Fordson	Annex O-3
Fulton	Annex N-1
Graham	Coliseum F-7-8
Garford	Coliseum D-3-4
Gary	Coliseum H-4
G. M. C.	Coliseum D-1-2
Indiana	Coliseum C-5-6
Kissel	Coliseum D-5
Lapeer	Coliseum A-2
Master	Coliseum B-3-4
Maxwell	Coliseum B-8
Mutual	Coliseum H-2
Nash	Coliseum C-2
Oneida	Annex M-1
Paige	Coliseum D-6
Pierce-Arrow	Coliseum C-3
Panhard	Coliseum G-3-4
Patriot	Coliseum H-1
Republic	Coliseum B-1-2
Riker	Coliseum B-6
Reo	Coliseum A-4-5
Sandow	Coliseum A-3
Sanford	Coliseum G-1
Service	Coliseum D-7-8
Truxton	Coliseum L-1
Tower	Annex O-1-2
Velle	Coliseum C-1
Walker	Coliseum C-7
Winslow	Coliseum J-1

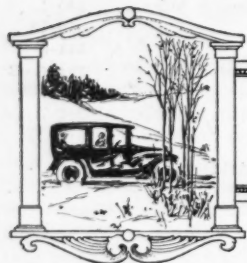
ACCESSORIES

Ahlberg Bearing Co.	Coliseum 78
Alemite Die Casting & Mfg. Co.	Coliseum 18
American Bronze Corp.	Coliseum 51
American Chain Co., Inc.	Coliseum 55
American Taximeter Co.	Coliseum 23
Anderson Forge & Mach. Co.	Coliseum 47

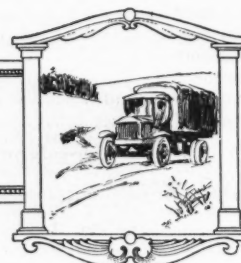
Arrow Grip Mfg. Co.	Coliseum 86
Buda Co.	Coliseum 33-34
Budd Wheel Corp.	Coliseum 50
Buell Mfg. Co.	Annex 107
Challoner Co.	Coliseum 72
Champion Ignition Co.	Coliseum 41
Chicago Mfg. Co.	Coliseum 5
Chilton Co.	Coliseum 8
Clark Equipment Co.	Coliseum 45-6
Class Journal Co.	Coliseum 2-3
Corbin Screw Corp.	Coliseum 85
Dixon, Jos., Crucible Co.	Coliseum 61-68
Electric Storage Battery Co.	Coliseum 42-43
Hassler, Robert H., Inc.	Annex 103
Inland Machine Works.	Coliseum 71
Morand Bros.—Martin Cush-ion Wheel Co.	Coliseum 96
Motor & Accessory Mfrs.' Assn.	Coliseum 77
National Refining Co.	Coliseum 17
Pantasote Co.	Coliseum 52
Parry Mfg. Co.	Coliseum 79-82
Pratt, William E., Mfg. Co.	Coliseum 83
Rowe, Calk & Chain Co.	Coliseum 65
Sewell Cushion Wheel Co.	Coliseum 64
Sherman & Ellis, Inc.	Coliseum 13
Simms Magneto Co.	Coliseum 44
Sparks Withington Co.	Annex 109-117
Splitdorf Electrical Co.	Coliseum 59-60
Stromberg Motor Devices Co.	Coliseum 57-8
Taft Pierce Mfg. Co.	Coliseum 39-40
Titeflex Motor Hose Corp.	Coliseum 76
Trindl Machine Works.	Coliseum 7
Tuthill Spring Co.	Coliseum 14
Vesta Accumulator Co.	Coliseum 92-3
West Steel Casting Co.	Coliseum 74
Waukesha Motor Co.	Coliseum 62-63
Wheeler-Schebler Carburetor Co.	Coliseum 66-67
Williams, J. H., Co.	Coliseum 22 & 32

DIRECTORY OF SHOW

Chicago, Jan. 27—F. Ed Spooner has issued his fifth annual directory of the Chicago show, the directory being distributed gratis by the Detroit Free Press. Spooner's directory containing the names and location of members of the trade attending the show, has come to be looked for as proving itself of great use.



EDITORIAL



Makers of the Chicago Show

THE purpose of the Chicago show, and it is serving that purpose, is to reawake the buying impulse which has been smothered by war conditions. By arousing this impulse the trade can get back to business and the factories have their market provided. In this present show, the dealers of Chicago have put life in the project abandoned by the manufacturers, have taken such cars as they could get, had new bodies put on, had them painted in fancy colors, had them reupholstered in bright shades, with this result, that the show visitor loses his involuntary feeling of apathy and begins to feel cheerful, begins to feel like buying a new car.

THE Chicago Automobile Trade Association had less than a month to produce the show, and the way they went at it is a lesson to other organizations. The first wise move was to get Samuel A. Miles as manager—Miles, who has put on every national show Chicago ever had, as well as the New York shows. Also, they got the decorations which Miles had been preparing last summer, before the National Automobile Chamber of Commerce decided against holding shows.

BUT the big thing was to get the support of the manufacturers and of the public. To this end, the dealers called the newspaper men into conference, told them that unless business came back there would be little motor car advertising and that the show was needed to put it back. The press put its shoulders to the wheel, all the motor car editors made a round of the factories, aroused the manufacturers to the idea that the shows were as national as they ever were, and the result is the fullest assistance from the factories and a good representation of the biggest manufacturers at the show. In arousing public interest, the newspapers have been most helpful, giving, according to Walter Birmingham, the publicity manager, about 60 per cent more support than in former years, by way of preliminary publicity, and the special motor car editions of Saturday and Sunday. At that, there was only two-thirds of the amount of advertising in the local papers that there has been in other years. Birmingham says it was the press that made the show. At any rate, the press were big factors. Though all honor should be given the trade association for the very successful results of such a short time of preparation.

Trend of Engineering Features

ALTHOUGH there is no marked tendency along engineering lines at the Chicago show, there are, nevertheless, features discernible on the chassis displayed which make it possible to forecast what the future holds in car and engine design. For one thing it is safe to assume oil cups will displace grease cups on spring shackle bolts and other chassis members. This is logical. Who, for instance, would think of loosening a seized piston with grease? Yet, that is the very thing we attempt to do when we try to force grease between surfaces separated by only a few thousands of an inch, as in a snug fitting shackle bolt. Oil finds its way where grease cannot penetrate. Chassis wick lubrication has indications of being used more extensively in the coming years.

THE overhead-valve engine gains in popularity as time goes on and will be used on cars not yet announced. This is for one thing, because the overhead-valve engine is a better manufacturing proposition in these of removable heads. The fuel is another reason. With the present-day variety the demand for completely machined combustion chambers is imperative.

THE question of fuel brings up discussion of heated manifolds, hot-spots and other contrivances to gain better vaporization. While several engines at the show are fitted with integral heating devices, the question of controlling heat has not been given the attention necessary. There should be means for regulating this in order that the volumetric efficiency of the engine be unimpaired. In the hot summer months, for example, it is desirous to shut off some of the heat, while in winter the reverse is true.

CHASSIS details have undergone a general simplification, and while individually they form too small timber for argument, collectively they mean better car performance and maintenance. We have better accessibility in the powerplant, better shackles, simplified frame construction, better brake mechanism, electric layouts and many more things of equal importance. The old idea that to secure easy riding and good all-around performance we must have heavy cars is fast dwindling, and everything is done to-day to secure lightness consistent with a good margin of strength.

Get Ready for Spring Tractors

IN the present stage of development of the tractor business it still is regarded by most dealers as a seasonable trade. This is due primarily to the fact that the tractor is used principally for plowing, and plowing is undertaken conventionally in the spring and fall. This notion is being overcome in some sections because the use of the tractor enables the farmer to plow in the summer and during the hottest part of the year. This is particularly the case in Nebraska, Kansas and Oklahoma.

IN nearly all other parts of the country, however, the dealer interests himself in tractors industriously just before the spring and fall plowing seasons. This leads to the suggestion

that it is time now to begin an active campaign for spring trade. All reasons, both adventitious and constant, encourage the use of the tractor and present indications are that there will be a demand this coming spring for all the tractors that can be built.

OBVIOUSLY then, the thing for the dealer to do at this time is to go over his prospect list carefully and begin at once to excite interest in his tractor line. The dealer who sold tractors the last year must have a list of likely prospects which it will pay to work on at this time, and the sooner the campaign is got under way the larger the results in sales are sure to be.

Cars, Tanks, Tractors and Airplanes

All to Come in for Consideration Next Week

NEW YORK, Jan. 25—Four professional sessions in addition to the meeting of the standards committee and special social features are scheduled for the annual meeting of the Society of Automotive Engineers to be held here Feb. 4-6.

At the opening session Lieut.-Col. H. W. Alden, a past president, and W. G. Wall, past vice-president, both of whom have been in charge of important engineering work in the Ordnance Department since the entrance of this country into the war, will speak respectively on "Tanks" and "Automotive Ordnance Apparatus." Other papers are "The Principles of the Wheeled Farm Tractor," by Edward R. Hewitt and "Automotive Applications of Marine Engines in the War," by George F. Crouch. Mr. Crouch makes the statement that the total power output of engines produced for submarine chaser service during the war is equivalent to the combined output of the powerplants of a mighty fleet of thirty dreadnaughts.

Session on Cars

The afternoon session of Feb. 5 is to be devoted to consideration of motor car subjects. Henry M. Crane of Simplex, Howard Marmon of Nardye & Marmon and O. F. Hunt of Packard will join in a symposium on the "Probable Effect of Aeronautic Experience on Automobile Practice." These men long prominent have been closely identified with aircraft development during the war and are, therefore, in a position to speak with authority on the important subject treated in their papers. D. McCall White, of Cadillac, will speak on "High-Efficiency Automobile Engines."

J. G. Utz of Standard Parts is to present a paper giving the story of the development of the U. S. standard military truck. Mr. Utz was for several months in charge of the motor transport engineering office of the Quartermaster's Corps and has since had opportunities to observe the performance of trucks at the front.

What may be termed the keynote session of the meeting is to be held Thursday morning. This session is to be devoted to consideration of the present fuel situation. The session was arranged at the suggestion of Dr. Joseph E. Pogue of the Bureau of Oil Conservation, who says, "We feel that the automotive industry has grown more rapidly than the country's capacity to provide gasoline and that a period of adjustment lies ahead which may prove disastrous if adequate steps are not taken in advance to meet the situation."

Other papers to be presented at this meeting include one by Dr. David White, chief geologist of the U. S. Geological Survey, on "The Unmined Supply of Petroleum in the United States," one on the "Present Status of Refinery Practice in the United States" by Dr. E. W. Dean of the Bureau of Mines, and a third on the "Status of Engine Efficiency in the United States" by Dr. H. C. Dickinson of the National Bureau of Standards.

The bearing which the Mexican supply

of petroleum has on the fuel situation is to be set forth in a paper entitled "Mexico as a Source of Petroleum and Its Products," by E. DeGolyer, a geologist and mining engineer of wide experience.

Thursday afternoon will be given over to a session on the subject of aeronautics. J. G. Vincent, vice-president of Packard and formerly chief of the airplane engineering division, Bureau of Aircraft Production, who was one of the original designers of the Liberty engine, is to give a paper on this engine which outlines completely the engineering problems involved in designing the engine, and explains how these were met. The paper gives also the reasons for adopting certain forms of construction, which, during the war, were subject to some criticism by those who did not appreciate all the reasons behind their adoption.

A paper on "Fixed Radial Cylinder Engines," which some believe will see wide development for aeronautic use in the near future, is to be given by John W. Smith. Lieut. Alexander Klemin, of the U. S. Air Service, a student of aerodynamics who has had rare opportunities to judge how to properly proportion airplanes to their engines, is to give a paper on this subject. Grover C. Loening, who has had much to do with the development of high-speed airplanes, is to present a paper entitled "Making the Airplane a Utility." Mr. Loening believes with others that the possibility of travel at high speed is an economic fact which will ultimately result in the development of a large aeronautic industry.

Four papers have been prepared by engineers in the Navy Department who had immediate charge of portions of the Navy Aircraft program. This enables them to speak at first hand concerning the matters they treat. These papers give an insight into the extraordinary accomplishment during the war of the Navy in matters pertaining to aircraft. Feb. 6 a victory dinner is to be staged at the Hotel Astor. Job E. Hedges will be toastmaster, and the speakers will include men of prominence in the automotive industry. Following the din-

ner, members and their guests will attend the Midnight Whirl at the Century Grove.

FROM PLANE TO TRACTOR

Chicago, Jan. 27—The meeting and dinner of the Society of Automotive Engineers Thursday at the Hotel Morrison will cover the field from airplanes to tractors. In the afternoon comes a technical session on tractor, truck and passenger car engines, with discussions of steam and air cooling as applied to cars, trucks and tractors.

The home-coming supper will be held in the evening with E. E. Peake, executive secretary of the National Automobile Dealers' Association as toastmaster and President C. F. Kettering of the S. A. E. as one of the speakers. Others on the program are H. L. Horning of the Waukesha Motors Co., H. H. Merrick, president of the Chicago Association of Commerce and Professor Nies of Lewis Institute.

It is the belief of many experts that airplane development will change motor cars radically in several features and also that the general public has not begun to realize the wonderful development of aerial transport that is just opening to this country. W. B. Stout, formerly on the MOTOR AGE editorial staff and during the war connected with airplane production for the Government at Washington will present some unusual ideas, both with reference to the commercial development of airplanes and the future development of motor cars which are expected to be of great popular interest. An original entertainment is promised to keep the members busy during the period between the professional session and the supper.

ALL SET FOR RICK

New York, Jan. 25.—Plans for the banquet to be given by the A. A. A. Contest Board to Capt. Eddie Rickenbacher, leading American ace and former racing driver, during the New York show, are going ahead, although Captain Rickenbacher is not due to arrive before Feb. 1. It will be held Feb. 3 at the Waldorf-Astoria, and the guests will include those prominent in the motor car field, Secretary of War Newton D. Baker, Gen. W. L. Kenly of the Department of Military Aeronautics and others. Clifford Ireland will be toastmaster.

The dealers have canceled their banquet which was to have been held the same night to co-operate in making this one a big success, and the motor club is helping make it a big night. Organizations that will co-operate in the banquet are the N. A. C. C., M. A. M. A., Automobile Club of America, Aero Club of America, Aircraft Manufacturers' Association, etc.

SUCH IS FAME

Detroit, Jan. 27—And now we soon will be eating the Ford tomato. Henry has just granted the request of David W. Beyer, a Dearborn, Mich., tomato grower, to let his product be known as the Ford tomato.

OVER THE TOP

BEGINNING with next week's issue MOTOR AGE will present a second series of its Over-the-Top articles. These articles are written specially for the service and repair station and are thoroughly practical. The repairshop on a commission basis, on a cash basis, advertising, the accessory department—these will be considered in turn. Six articles in all will be published, beginning next week.

\$300,000,000 for Road Work This Year

About Half of This Amount Will Go for Labor—Estimates by States

WASHINGTON, Jan. 24—About \$300,000,000 will be put into road building this year, according to estimates by experts of the Department of Agriculture, submitted to the Division of Public Works and Construction Development of the Department of Labor. It is estimated that about half this amount will go to labor.

The \$300,000,000 of construction estimated will not be sufficient to make up deferred war construction, it is believed, for normally the amount spent on roads in the United States is not far below \$300,000,000, and during wartimes road building came almost to a stop in many localities.

Estimates prepared for the following states are considered accurate within 1 or 2 per cent, according to officials of the Department of Agriculture:

Maine	\$ 1,500,000
Rhode Island	90,000
Connecticut	4,000,000
New York	12,000,000
New Hampshire	175,000
Kentucky	1,500,000
Alabama	1,000,000
West Virginia	16,000,000
Illinois	9,000,000
Iowa	15,574,000
Louisiana	4,674,000
Texas	20,000,000
Nebraska	1,657,089
North Dakota	3,000,000
Wyoming	653,000
Colorado	3,900,000
California	20,000,000
Arizona	900,000
Nevada	1,148,850
Idaho	1,000,000

New Jersey, Maryland and Montana are expected to make considerable expenditures on roads this year.

ASSOCIATION IS REVAMPED

Chicago, Jan. 27—The Illinois State Automobile Association met at the Lexington Hotel to-day and took steps which, if they can be carried out, will put it into a prosperous and influential position. These consisted principally in a new platform and a change in the by-laws to make the membership basis of the association one of clubs rather than persons. Also it was decided to inaugurate a vigorous campaign for the organization of clubs at every important population center throughout the state.

The new platform pledges the watchfulness of the association to see that the money of the motorists of the state, which eventually will be used to redeem the \$60,000,000 road bonds, is spent to the best advantage, to agitate for uniform traffic regulations for all state roads, including those sections of the roads which pass through cities up to 10,000 population; to secure the appointment of an efficient state constabulary to insure the enforcement of the traffic regulations, to compel the uniform marking of all state highways and to insist upon an intelligent marking of

all necessary detour routes. In addition, the association endorses the theory that all counties entitled to refunds shall spend such money for the construction of additional roads and for no other purpose.

About seventy-five delegates were present, representing something in the neighborhood of twenty clubs and organizations. The meeting was addressed by S. E. Bradt, state superintendent of highways, who briefly went over the road projects in view for 1919.

The following officers for the ensuing year were elected: President, Henry Paulman, Chicago; vice-presidents, T. M. Beatty, Quincy; H. O. Whitney, Rockford, and W. H. McCullough, Aurora; treasurer, T. J. Hay, Chicago.

Overland Will Share Profits 50-50 With 10,000 Workers

TOLEDO, Ohio, Jan. 27—Willys-Overland will go fifty-fifty with its employees on profits hereafter. This applies to workers in all branches and will affect 10,000. Profit sharing will be based on the length of time the employee has been with the company, and it is estimated that none's share will be less than \$100 a year. A fair return on the capital invested is provided for in the grant.

Distribution is to be retroactive to Jan. 1, 1919, and will amount to hundreds of thousands of dollars. In announcing the plan, John N. Willys says:

After permanent capital and permanent labor have each been justly compensated, having due regard to the cost of each—the cost of capital and the cost of living—then the additional profits accruing from the joint employment of permanent capital and permanent labor shall be divided equally among them—fifty-fifty.

I am determined to do my best to work out for our companies the plan which will recognize this right.

The detail plan, when ready to present, will recognize and reward individual efficiency, departmental efficiency and increasing reward for continuous service, and these plans will have no influence on periodical adjustments of wages.

H. E. COFFIN IN EUROPE

Detroit, Jan. 25—Howard E. Coffin, vice-president of the Hudson Motor Car Co., is traveling in Europe studying the latest developments in aviation and motor engineering. Mr. Coffin's interest in aviation dates back to the early days when, as a highly successful motor car engineer, he gave considerable of his time to the flying art.

The excellent work that he did before we entered the war, as chairman of the industrial preparedness committee of the Naval Consulting Board, in co-ordinating the industries of this country for war work and during the war as chairman of the Aircraft Production Board, has now come to be recognized by the Allied governments as well as our own. Through the courtesies of the French, British and

Italian governments, he is traveling through these countries under special passport, visiting every point of particular interest.

He went to France early in November, and before he completes his survey he will have visited every air base of any importance in the various countries. He doubtless will bring back to America an interesting report on aviation and motor car development, not only during the war but more particularly since the armistice was signed.

BOSCH IS NATURALIZED

New York, Jan. 24—American Bosch Magneto Corp. is the new name of the entirely re-organized Bosch Magneto Co., which Dec. 7 was sold by the alien property custodian. Under the new regime the Bosch company is 100 per cent American and has as its officers the following: President, A. T. Murray, president of the Bethlehem Motors Corp.; vice-president and treasurer, George A. MacDonald, president of the Chicopee National Bank, Springfield, Mass.; vice-presidents, A. H. D. Altree and Leon W. Rosenthal; secretary and assistant treasurer, J. A. MacMartin.

The new company has taken over the entire holdings and property of the old, including the Springfield plant and all American and foreign patents and trademarks under which the old company operated. At the time the plant was sold by the alien property custodian it was operating practically to capacity on Government work.

BACK ON THE MARKET

Detroit, Jan. 27—Simultaneously with the bankruptcy sale of the Pontiac plant of the Monroe Motor Co., a new Monroe four-cylinder car appeared on the local market. The car is manufactured by the William Small Co., Indianapolis, Ind. This company bought the patents, output and good will of the bankrupt concern and has just got into production on a fair scale. The car is selling at \$1,195, which is \$100 more than the price of the old machine. The Small company contemplates manufacturing 2500 cars by July 1.

STUDEBAKER BACK TO CARS

South Bend, Ind., Jan. 27—Indications that some of the manufacturers of motor cars may get back into production earlier than they anticipated are provided in the word from Studebaker that it has been able to get into after-war production thirty days ahead of schedule. At present this concern is averaging sixty passenger cars a day, and this figure will be increased 100 per cent by March 1. Studebaker expect to produce approximately 6500 cars during the first quarter.

GOOD ROADS CONVENTION

New York, Jan. 25—The Ninth American Good Roads Congress and the Sixteenth Annual Convention of the American Road Builders' Association will be held at the Hotel McAlpin Feb. 25-28. The general plan is to devote Feb. 25 and 26 to the presentation and discussion of papers and the 27th and 28th to the consideration of reports of committees. The business session will be held on the afternoon of Feb. 28 and the annual banquet on the evening

of the 26th or 27th. It is proposed to show motion pictures pertaining to highways on two evenings during the congress.

Committees will submit reports on regulations covering speed, weight and dimensions of motor trucks; methods of financing highway improvements for state, counties and town; convict labor on highway work, etc.

It was decided to postpone the exhibit of road machinery, equipment and materials until next year.

PACKARD CARS BY SUMMER

Detroit, Jan. 24—No new Packard cars will be ready for the distributors before early summer. This company, which was working 100 per cent on Liberty aircraft engines and Packard Army trucks, is obliged to reorganize its plant completely before passenger car production can be resumed. War contracts are being wound up. The last of the Liberty engines are about to be run through, but there are still many trucks to be made.

SCRIPPS-BOOTH TO EXPAND

Detroit, Jan. 24—The General Motors Corp., which recently gained control of the Scripps-Booth, will establish that company in a new \$1,500,000 factory building as soon as a suitable site can be obtained. The proposed plant will have a capacity of 25,000 cars annually. Scripps-Booth was not seriously affected by the sudden ending of the war inasmuch as it was not engaged very extensively in Government work. The company is running twenty cars daily, but in February it expects to boost production to thirty cars. While 5500 machines were built last year, the 1919 schedule calls for the manufacture of 10,000.

TWO 1919 A. A. A. RACES

New York, Jan. 24—The Contest Board of the American Automobile Association has issued two sanctions for race meets during 1919. The first of these is for a meet to be held on the Ascot speedway in Los Angeles by George R. Bentel, Jan. 26; the second is for the revival of the 500-mile sweepstakes race which is to be held on the Indianapolis speedway by the Indianapolis Motor Speedway Corp. May 31.

BARNEY OLDFIELD, TIRE MAKER

Chicago, Jan. 27—Barney Oldfield, the veteran racing driver, has branched out into the industry as the head of a new tire concern known as the Oldfield Tire Co. to be located at Cleveland, Ohio. He says this definitely marks his retirement from racing, but inasmuch as he is as consistent an annual retirer as Sarah Bernhardt, his friends are not sure that he is lost to the world of speed permanently.

NATIONAL HIGHWAY CONFERENCE

New York, Jan. 24—A conference on "Regulations Covering Speed, Weight and Dimensions of Motor Trucks" will be held under the auspices of the National Highway Traffic Association at the Automobile Club of America Jan. 31.

Standard Tire Sizes to Be Continued

Rubber Association Decides to Keep Nine Types Determined in War

NEW YORK, Jan. 24—The nine standard sizes of pneumatic tires evolved by the war service committee of the Rubber association of America in conjunction with the Society of Automotive Engineers are to be continued. This was decided at the annual meeting of the Rubber Association held at the Waldorf here.

These nine sizes include both plain and non-skid treads in the following dimensions, all being straight-side type except the two smallest, which are clincher: 30 by 3½, 31 by 4, 32 by 3½, 33 by 4, 34 by 4½, 35 by 5 for passenger cars and 36 by 6, 38 by 7 and 40 by 8 for commercial vehicles.

These are the sizes which the industry decided it could get along with during the war, eliminating all others of the 287 sizes which heretofore have been made. Now that the war is over, it has been decided that the benefits of standardizing on these sizes may well be perpetuated; hence, the decision.

Prior to the meeting at which this action was taken, the war service committee was disbanded formally, and to the Pneumatic Tire Division of the association there has been added a solid tire division headed by A. G. Partridge, sales manager of the Firestone Tire & Rubber Co.

Homer E. Sawyer, vice-president in charge of the footwear division of the United States Rubber Co., was elected president of the association, the other officers elected being: First vice-president, Harry T. Dunn, Fisk Rubber Co.; second vice-president, F. A. Seiberling, Goodyear Tire & Rubber Co.; secretary and treasurer, Harry S. Vorhis.

Gasoline May Drop

WASHINGTON, Jan. 24—A considerable decrease in the price of gasoline may be expected in the near future as a result of the United States Shipping Board's action in turning back 145 tankers which had been commandeered for war purposes and which are now returned to their owners. The majority of these vessels will be employed soon to transport oil to this country from Mexican fields. The total dead weight tonnage of the ships returned to their owners is 1,140,000.

The oil reserve of the United States has been drained of approximately 25,000,000 bbl. by war demands. Figures published recently here show that despite popular belief the greater part of British oil was derived from Mexico, all but 3 per cent in reality came from the United States, which was obliged to supply the British as well as the American armies with oil.

It is stated here that importations of oil from Mexico probably will exceed 80,000,000 bbl. during the next twelve months. This, it is expected, will result in a decrease in the price of gasoline and oils in this country.

PNEUMONIA TAKES STROM

Chicago, Jan. 24—Walter H. Strom, president and general manager of the U. S. Ball Bearing Mfg. Co., died Wednesday night of pneumonia following influenza. His death followed closely that of his wife, and a little son, Guilford A., died soon after his father, all from the same cause. Another son, Walter H., Jr., is very ill. Mr. Strom is the son of A. A. Strom and has been the active head of the company since its inception.

HEMINGWAY WITH M. A. M. A.

New York, Jan. 24—M. L. Hemingway has been appointed assistant manager of the Motor and Accessory Manufacturers' Association. He assumed his new duties Jan. 18. For the last year he has been secretary of the war service committee of the Rubber Association of America.

Harry S. Harkness



NEW YORK, Jan. 24—Harry S. Harkness, formerly president of the Sheepshead Bay Speedway Corp., died last night at his home in this city. He was thirty-eight years old. Mr. Harkness was one of the first car owners to drive his own car in races and competed against wealthy owners, who in earlier days drove their own cars in contests. He was also a pioneer aviator, making a 46-mile flight as far back as 1911 to demonstrate the utility of the airplane in military service.

How Industry Helped in War—Car Shortage

Contracts Are More Than \$1,000,000,000

WASHINGTON, Jan. 24—That the War Industries Board policy of curtailment of peace industries was proper and necessary, and that the automotive industry co-operated in a most commendable manner with the War Industries Board is the text of an outline of the activities of the Automotive Products Section by C. C. Hanch, chief of the section. The outline, made public to-day, states, among other things, that during the last six months of 1918, when production of passenger cars was limited to 50 per cent of 1917, manufacturers requested permits for production of 295,468 cars, which were allowed. Of these, 186,178 cars were produced during the third quarter, leaving 109,290 to be produced during the last half of the year. This total of 295,468 cars is approximately 50 per cent of the production of 1917, not counting Fords. The Ford company made no request for permission to manufacture passenger cars in the last half of 1918. That the industry "was most valuable to the war machine and took on military works exclusive of motor trucks to the extent of \$1,000,000,000," is stated in Mr. Hanch's story. "The industry has been of incalculable aid to the successful prosecution of the war," testifies Mr. Hanch.

Curtailment Found Necessary

Control of the industry by the War Industries Board and its curtailment insofar as passenger car manufacture is concerned, was found, according to the statement, to be "necessary due to the drafting of millions of men and the resulting shortage of labor, transportation, fuel, etc.," which made it "obvious that non-war industries could not reasonably expect to continue normal activities."

Before the United States entered the war, says the report, American truck makers had furnished more than 40,000 trucks to England, France and Russia. After entering the war and prior to the armistice, motor truck and passenger car makers contracted to furnish the American army and navy about 35,000 passenger cars and 200,

000 trucks and ambulances. About half this had been done at the signing of the armistice. Of this number, 54,343 has been shipped to the A. E. F. and 15,000 were in use by the military forces in this country. More than thirty truck makers supplied trucks for the Government. Many makers gave up all or most of their commercial trade to furnish the trucks and automotive equipment they did.

However, passenger car and truck makers did not confine themselves to the production of automotive equipment. Among other articles manufactured by them, in addition to passenger cars, trucks, airplane engines and parts, cites the report, were:

- Submarine chasers.
- Tractors.
- Trailers.
- Ambulance bodies.
- Tanks.
- Gun carriages.
- Gun recoil mechanisms.
- Naval gun mounts.
- Escort wagons.
- Water carts.
- Airplane bombs.
- Litters.
- 75- and 155-mm. shells.
- Depth bombs.
- Airplane bombs.
- Mine anchors.
- Grenades.
- Shell adapters.
- Torpedo directors.
- Balloon winches.
- And many other articles.

As a whole, concludes the report, the industry has been of incalculable aid to the successful prosecution of the war.

WHITE TO MAKE TRUCKS ONLY

Cleveland, Ohio, Jan. 27—The White Motor Car Co., while not withdrawing from the passenger car field, will devote its entire time to the manufacture of trucks. No passenger cars have been made since the start of the war and the company does not contemplate putting out a new passenger car at present. White has planned the most extensive truck construction schedule in its history. A new type of truck has been brought out and will be on exhibit at the New York and Chicago shows.

Only 15,545 Finished Models Dec. 31

WASHINGTON, Jan. 24—Dec. 31 only 15,545 finished passenger cars were in the hands of manufacturers. This represents only three days' normal production—three days' normal sales. At the same time truck manufacturers planned a production of 327,930 motor trucks for 1919—plans made after the armistice was signed—a production of 100,000 trucks more than that of 1918 and based on purely commercial absorption.

These remarkable figures exhibiting a passenger car market practically drained and a motor truck business anticipated for the coming year far in excess of even war demands are made public in a letter from C. C. Hanch, chief of the Automotive Section, War Industries Board, to the industry. The letter states that production of passenger cars in 1918 totaled 926,388 as against 1,740,792 in 1917, a reduction of approximately 50 per cent.

Cars Ordered

Passenger cars ordered by the Government up to Jan. 1 totaled 38,472, of which 18,808 were delivered, 19,649 cancelled and 7,904 shipped overseas. But fifteen remain to be delivered.

Total motor truck production for 1918 was 227,250, as against 128,157 in 1917. The 1918 production included 164,264 for civilian use, as against 109,865 for civilian use in 1917 and 62,986 for military use in 1918, as compared with 18,292 in 1917.

Reports from truck manufacturers indicate that the total number of trucks in the hands of the makers Dec. 31, including those to be delivered for military use, totaled only fifteen days' production.

Production of trucks in 1919 as planned by the manufacturers shows a predominance of 1-ton trucks with 2-ton, 1½-ton, ¾-ton, 3½-ton and 5-ton next in the order named.

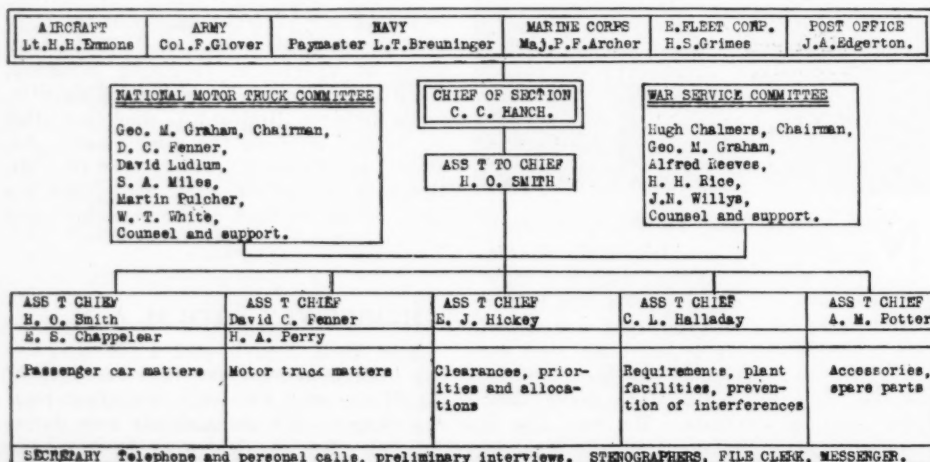
A summary of the Government truck business shows 204,760 ordered, 100,000 delivered, 78,081 cancelled and the balance due of 26,679. The Postoffice Department has made requisitions on the Army for 17,135 trucks.

No motor trucks now overseas will be returned to this country, and but few of the trucks in the hands of the Army in this country will be offered for sale to the public, says Mr. Hanch.

A NEW ALTITUDE RECORD

Washington, Jan. 25—Another record for altitude in a monoplane has been made by Maj. R. W. Schroeder. Major Schroeder, with two passengers in a monoplane climbed to a height of 19,500 ft. in 31 min. at McCook field.

The previous record for a machine of this type was said to be about 16,000 ft. The plane was built by Grover C. Loening, of Long Island, N. Y., and was powered with an eight-cylinder engine. It has developed a speed of 145 m.p.h.



Organization of Automotive Products Section of War Industries Board

Fewer New Cars This Year

Tried and True Models Mostly—
More Attention to Details Shown

By B. M. Ikert

Motor Age Editorial Staff

THOSE who buy cars as a result of a visit to the Chicago show this year have reasonable assurance that the car will perform, because nearly everything shown has been tried by a year or more. That is to say, the visitor will find about the same array of cars as he did last year, there being but one totally new job, the Essex, while some dealers are showing special bodies on a standard chassis. A few years ago at show time the layman was confronted with all sorts of new mechanical and electrical devices, carburetion outfits, in fact, so many alluring features, that when the show was over one was more undecided than ever what to buy. This year buyers will carry from the show fewer novelties and, consequently, fewer chances for failure.

Apparently manufacturers have taken advantage of last year's curtailment to perfect details of chassis and bodies, for although we see fundamentally the same cars as last year, closer inspection reveals many refinements in the greater percentage of cars. Some makers announce new models but after all these are simply a rearrangement of old and accepted ideas, with nothing experimental about them.

Whatever other changes have been made in this year's cars one feature is evident in a great number of cases, designers have secured more room for passengers on a chassis of given wheelbase. This, however, is in some cases detrimental to the cars in looks, for the radiator has been placed so far forward of the front axle that the effect

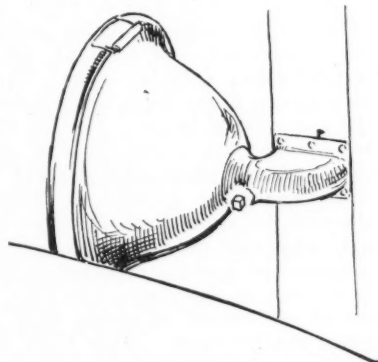
is clumsy. Especially is this so where shutters are used on the radiator. A better disposition is made of the driving compartment on some cars by a shorter hood and cowl, affording greater distance between the front seat and dash. Instances of where the radiator is placed ahead of the axle are found in cars like Dorris, Hudson, Essex, Paterson, Cole and Elgin.

Exterior hardware seems to be coming back. Door handles and, in many cases, hinges are placed on the outside as was the custom some years ago. A notable example of this is the Paige Larchmont, which has both handles and hinges on the outside of the body. It is an open question whether or not this construction is a disadvantage when winter curtains are used, as the doors cannot be so conveniently opened from within. Nevertheless it is a fact that these little touches of nickel-plate on the large unbroken surface of bodies act as accents and afford relief to the eye from the large masses of unbroken color in the body panels. Essex, Elgin,

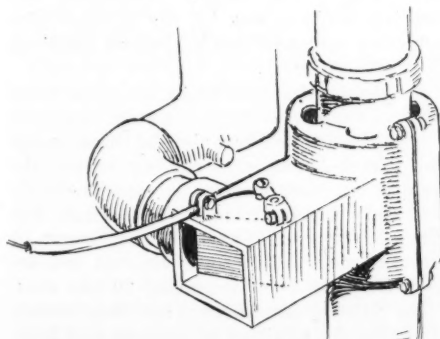
Studebaker, Liberty, Cole, Haynes, Nash and Chandler are examples of door fittings on the exterior.

To those studying the trend in hood design it cannot but be apparent that attention has been given the louvres. In past years it was the custom to cut a few wide louvres, while this year the style seems to be for very narrow openings but many of them. Thus the area of opening is the same or greater, while the effect is more pleasing, for it looks less patchy. Narrow louvres are found on the Packard, Paterson, Elgin, Auburn, Chandler, Kissel, Cole, Haynes, Paige and others.

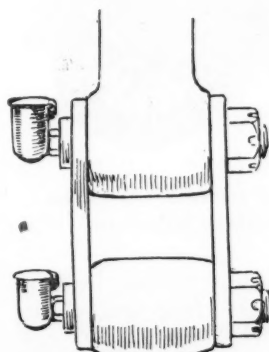
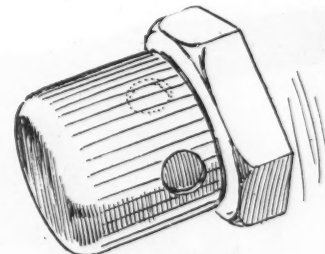
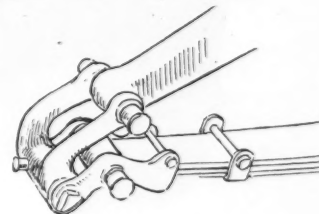
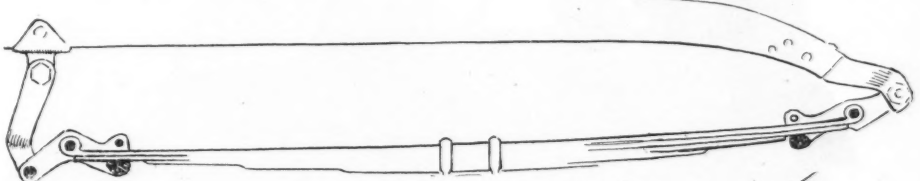
In connection with cooling mention might be made of the growing tendency for ventilators, either in the top of the hood or cowl. When these are placed in the top of the cowl they frequently perform the dual function of ventilator and skylight to illuminate instruments in the driving compartment. These little ventilators when tilted at just the right angle give a rather rakish atmosphere to the car, to say nothing of the relief given the front-seat passengers in hot weather. Ventilators such as these are found on the Daniels,



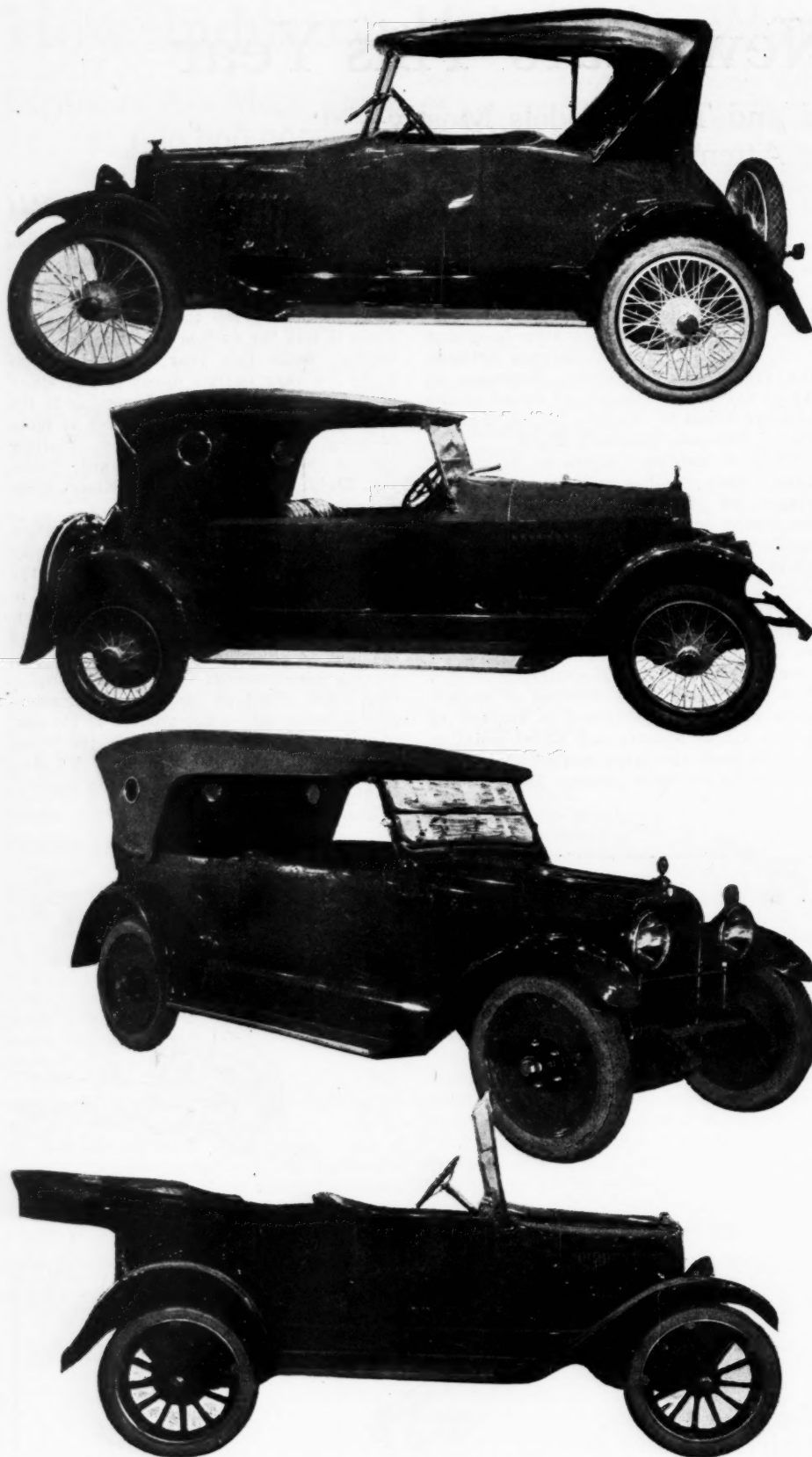
Mitchell headlamp mounted on radiator



Dorris heat control for carburetor



Oil cups on the spring shackle bolts fast are replacing grease cups, and self-oiling bushings are gaining favor



Among the new cars were, from top to bottom, the Saxon roadster, Apperson, Mercer with disk wheels and up-to-date top and the Overland light four

Apperson, Standard, Fiat, Packard, Kissel, Haynes, Essex and one or two others.

Lamps have come in for their share of attention, too. Bullet-shaped lamps are popular on the sport models such as Roamer, Apperson and a few others, while Stutz has

a lamp shape distinctly its own. On the new Mitchells the head lamp brackets are integral with the radiator shell. The method of running across tie rod from lamp to lamp is still quite popular on many cars.

Although announced last year, the one

new car at the show is the four-cylinder Essex, built at the Hudson factory. This car was brought out to meet the demand for a moderately-priced lightweight car to incorporate features of cars costing much more. The Essex is made in one style only, five-passenger, on a 108½-in. wheelbase. The engine has a bore of 3⅞ in. and stroke of 5 and is said to develop something like 50 hp. It is cooled by thermo-syphon, with the outlet manifold placed on the right side of the head to allow intake valves being placed directly in the overhead center of the cylinder. The valve rockers of the inlets operate on roller bearings. The exhaust valves are on the side of the cylinder block. Balanced crankshaft and removable head are other features of the engine.

Oiling of the Essex engine is carried out by the circulating splash method. The pump stroke is adjustable and operates in conjunction with the throttle. Thus when the throttle is opened more oil is fed and vice versa. The engine is only 29 in. long. In unit with it is an eight-plate disk clutch running in oil. Ignition, starting and lighting is Delco. Timken axles are used. The radiator is fitted with shutters, similar to Hudson, and controlled from the dash.

Straight Lines on Essex

Straight lines are very much in evidence on the Essex, and the bevel edge runs all the way to the radiator. In the minds of some this would have looked better had the bevel been tapered to a point at the forward end. Upholstery is genuine leather, applied in French plaited style. Curtains open and close with the doors, and the standard body color is green. Tires are 32 by 4.

The new series H Elgins are shown for the first time. Some thirty odd improvements have been made, and prominent among these are the larger wheelbase, now 118 in., greater power and better body design. The radiator is higher, which not only adds to the looks but helps cooling. The body sides are now straight, where they formerly had a double curve. There is more leg room in the front compartment, and the trimming is better. The top also has been made flatter, and the rear curtains carry bevel plate glass instead of celluloid. The front springs are longer, and the rear have been set closer to the frame to eliminate twisting. One of the most appreciated changes, a change in fact that is evident on many cars this year, is the use of oil instead of grease cups on the spring shackle bolts. Other Elgin improvements consist of new location of starting motor, deeper upholstery, battery under front seat, better engine lubrication and steering made easier by the greater gear reduction and addition of bronze bushings on shaft.

Although the Pierce-Arrow dual-valve six was announced some time ago last fall, it is shown for the first time at the Armory. The Pierce-Arrow cars are, of course, the same as last year's so far as general chassis and body construction is concerned, but with the four-valve-per-cylinder layout 30 per cent more efficiency is secured and acceleration has been increased 20 per cent.

The Liberty line of cars has been rounded out by the addition of a coupe and four-passenger. The body lines have been al-

tered somewhat, and a corrugated steering wheel replaces the plain rim of last year. The number of louvres in the hood has been increased, and this not only adds to the looks but affords better cooling. The sedan is of the four-door type and has many refinements, such as heater, Neville drop steering wheel, more room in compartments, and the driver's compartment is finished in straight-piped leather.

Apperson has in addition to its anniversary model selling for \$4,000 a car called the standard model at \$2,600. In the anniversary model the appointments are very complete, consisting of polished metal instrument board, added nickelplating, etc., while in the standard model elaborate frills have been omitted. The standard has the eight-cylinder engine and has a 130-in. wheelbase. The lines of the radiator, location and shaping of louvres are particularly clever in this job. Mechanically the construction is distinctly Apperson all the way through. Standard color is thistle green, and it is stated the car is capable of 60 to 65 m.p.h.

Adjustable Driver's Seat

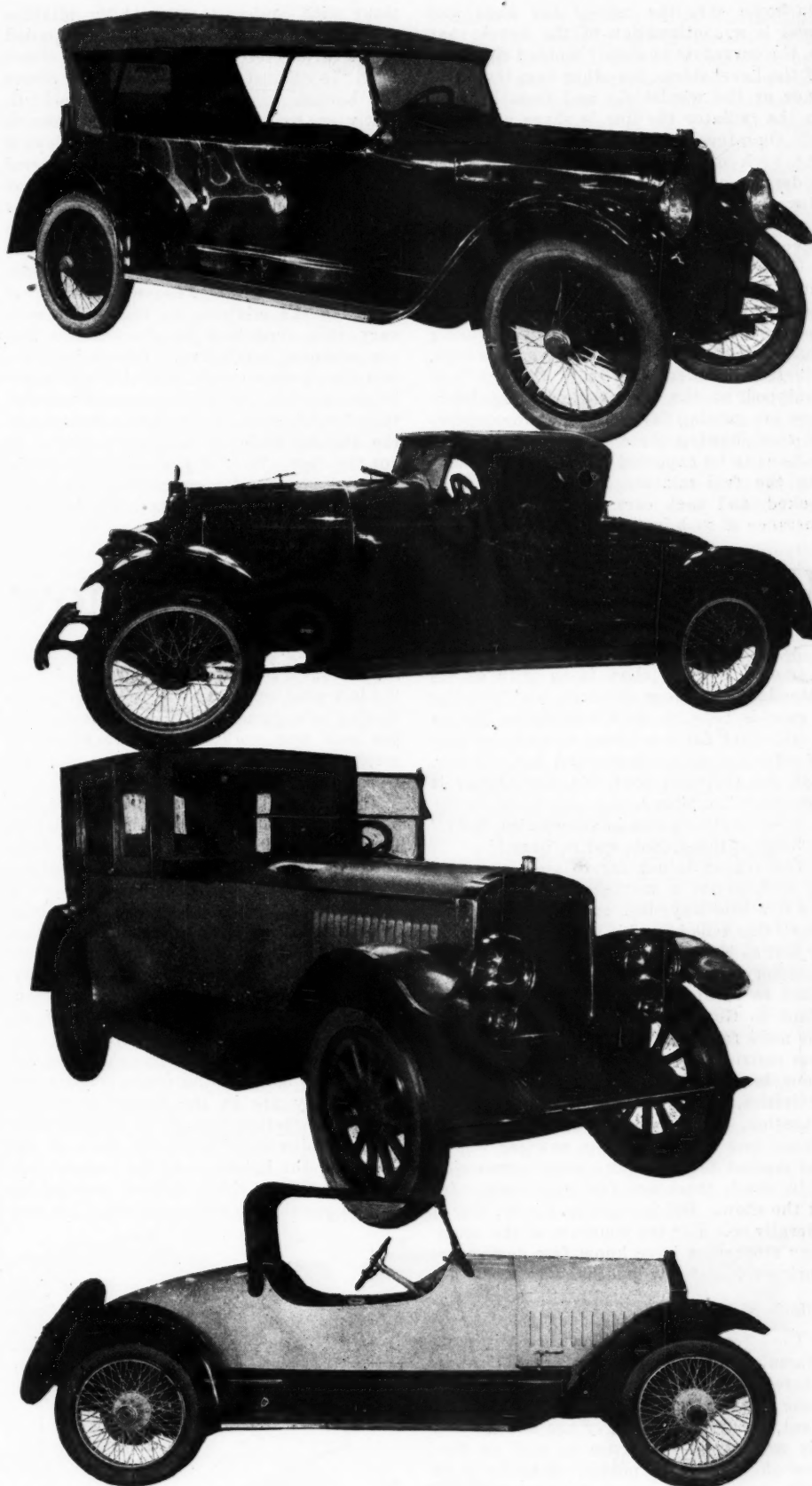
An innovation in the form of an adjustable driver's seat is found in the Scripps-Booth line, which is much the same as last year's car, although two new body styles have been added, a sedan and coupe. However, the mechanical and outward appearance appear the same as formerly.

Daniels is showing a new four-passenger car painted in blue with an unusually attractive upholstery. The car is essentially a sport model and carries a golf bag on the left side just back of the front fender, with leather to match the upholstery and a Victoria top matching the paint work.

It is especially gratifying that tops have much more attention this year than formerly. In several cases the top has been made flatter to harmonize with the tendencies for straight body lines. Gypsy curtains have been made use of to hide the bows, and drab colors are used extensively on the sport models. Bevel-plate glass windows held in place by a nickelplate rim, give many of the tops a much more decorative appearance than possible with the conventional celluloid variety. A little touch of nickel in the top in this way helps further to accentuate the body panels the same as exterior door handles, etc. The Cole Aero-Eight top is a novel creation of the Victoria type with natural wood bows. Johnson plate glass windows are used at the side and rear.

Another model making its appearance at the Chicago show this year, touring and inclosed styles, is the little Overland four. It was shown at last year's show but not in nearly as complete form.

That the public is interested in the starting and lighting equipment announced recently by the Ford company is shown by the crowd constantly surrounding the Ford booth in the armory. The installation of both starting motor and generator has been carried out deftly. The former is located on the left side just ahead of the flywheel housing and is in communication with the teeth of the flywheel by Bendix drive. The generator drive has been taken off the timing gears at the front, with the generator placed on the right side. Both starting



Other new cars were, top to bottom, a stock Paige four-passenger, Kissel speedster, Winton with coach-built body and this white National

motor and generator drives are entirely inclosed. The usual oil filler pipe position has been retained although brought forward a trifle. So far the starting and lighting system is shown on the closed cars only. The battery is a 6-volt Exide. The

instrument board carries an ammeter, Yale switch lock and dimming device.

The show visitor need not necessarily be keen of observation to see the continued popularity of the bevel-edged body, which in some cases is carried out very neatly.

On some cars the top of the hood and cowl is a continuation of the bevel, that is, the curvature is simply molded right out of the bevel sides. On other cars the bevel ends at the windshield and from here on to the radiator the line is sharp or rounded. On a few cars the bevel extends around the back of the body but made a little wider; as on the Apperson four-passenger. Haynes, Kissel, Elgin, Essex, Paterson, Owen-Magnetic, Studebaker and others are advocates of the bevel-edge body.

Chassis lubrication has come in for much attention, and it appears as though the knell of the grease cup has been sounded. Oil cups on the spring shackle bolts fast are replacing grease cups, nineteen makers of cars being thus equipped at the show. Self-oiling bushings are gaining favor, three or four makes of cars showing these in the spring bolts.

As is to be expected the subject of heating the fuel mixture has not been overlooked, and such cars as emphasized importance of such installations last year con-

tinue with devices to preheat the mixture or fuel this year. Heat either is applied to the carburetor by a waterjacket or direct from the exhaust to hot-spots. Nash places the bottom of the exhaust manifold directly on top of the intake and seeks to gain heat in this way. Mercer employs a pretentious looking hot-spot built integral with the carburetor and brings exhaust heat to it by a tube. Chalmers continues with the hot-spot construction, while Paige retains the electrically heated carburetor bowl. The coming years may see developments along the line of controlling the heat going to the mixture, so the owner may vary this according to atmospheric and temperature conditions. Complaints are common in some localities that heated manifolds, get too hot in the summer months, thus lowering the volumetric efficiency of the engine, while in colder weather it is not the case. Thus it appears there should be ready means for controlling this heat, either manually or automatically by thermostats.

haps no more novel than the actual operation of the device—means of putting his product to work.

For instance, passing the exhibit of the Simms magneto, it is only human nature for some one to come along and turn the handle which makes a magneto on its stand spark, and the sparking was continuous this afternoon. Gabriel Snubbers have not only a working device but a "talker." This working model appeals to every car owner and incidentally makes a good talk for the device in that the contrast between "with" and "without" is made very strong indeed, two dolls fairly flying upward "without."

Cutaway Carbureters

Stromberg has a cutaway of its carbureters, inclosed in a glass cabinet, cutaway sections revolving before the spectator with intermittent lighting. Splitdorf has a fully equipped engine—equipped with its electric products, of course—and a spark plug stand, from which the sound of the spark comes continuously. Hartford and Hassler have two working models of shock absorbers. Champion ignition attracts the passer-by with a huge model spark plug, in operation. The Globe Mfg. Co. sends out a hum of activity from its electrically-operated air compressors, while the salesmen in the exhibit of the Parker collapsible rim keep up a continuous demonstration of their device.

The Imperial Welding Kid, complete to protective goggles, does a good job of welding, while Lane Brothers have a white-enameled car section raised from time to time by their long-handled jack. New Era springs have a working model also, as has the Joseph Dixon Crucible Co. Stewart-Warner has its usual well-thought out display, with the white and gold chassis on which the vacuum system is installed and in operation. In addition a revolving V-Ray spark plug is there. A not-unwelcome breeze touches the visitor to the show as he passes the display of the Mechanical Belt Co., for it has a fan belt in operation.

The U. S. Auto Gear Shift Co. was attracting a good deal of attention this afternoon. This is the concern organized some time ago to make the Laursen hydraulic gearshifting device for motor vehicles. It built a good-sized plant last year, but the manufacture of the gearshift-

Few New Accessories at Show

CHICAGO, Jan. 25—The nineteenth annual Chicago show is on with all its attendant accessory displays, and Mr. Car Owner is here at the accessory booths on a still hunt for something new in the way of offerings to his pride and joy, his car. But, for the most part, Mr. Car Owner is somewhat nonplused.

"See anything new in accessories, Bill?"

"Not a thing, Bob, not a thing."

The reason is not far to seek nor hard to find, given a moment's thought. You see it's this way, Bill and Bob. War and war's demands have hit the accessory maker just as hard as it did the car maker. The accessory maker was no slouch when it came to turning over the facilities of his plant to Government work either. Then, the mere fact that the manufacture of cars was restricted and limited through restrictions, lack of materials, conversion to other activities, and so on affected the accessory situation. This was true even though the owner who could not get a new car was in the market for other and more accessories.

In short, there are few new accessories at the show. Bill is right in a way, almost literally so. For the counters of the accessory stockroom have known few newcomers during the last few months.

Effect of War

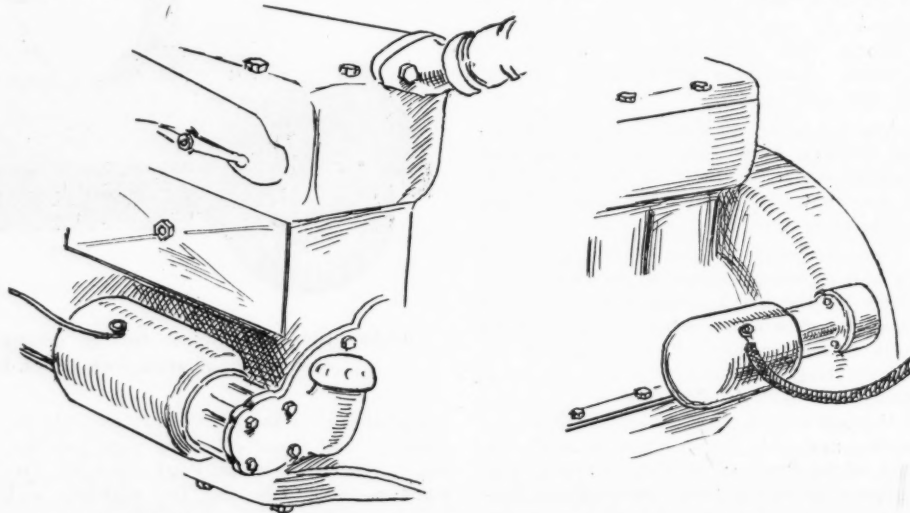
The effect of war work on accessory manufacture is evident in a few instances wherein the manufacturer has developed some new models of an accessory, or equipment, for Army and Navy use and, finding his work good for peace as well as war, now offers it to the public. Schebler is an example. This concern developed a new plain-tube carburetor for Government use and is now offering it for commercial use. Its features are described further on in this same article.

Sparks-Withington is another example. This concern has on display the Sparton trench horn, which is a hand-operated horn whose tone was relied on to over-ride the shriek of shell and detonation of rifle and machine gun. It signaled the presence of

gas. Sparks-Withington has had an interrupted output of its regular lines during the last year, owing to war work, with continuing enlargement until the plant was 100 per cent war work. There are other examples no doubt, and this is why, Bill and Bob, there are so few new accessories.

To a visitor coming to the show on the opening day and keeping on the outlook for such, it seems as if the car's tires have come in for a majority of the attention. This seems especially so in view of the attention attracted by the various exhibits. The half-sole, the vulcanizer, the tire filler, all had their crowds when their neighbors might not temporarily. This might be explained partly by the presence of demonstrators, as ever-effective methods of attracting attention at the show.

The working models at the show are not confined to those in the passenger car section. They are in the accessory section also, and whether you go to the balconies of the Coliseum, the second floor of the Annex or the balconies of the armory, you will find this or that exhibitor making his bid for popularity with some novel—or per-



Starter installation on Ford—at left, generator; right, starting motor

ing device was made second to a Government contract for parts for coast defense and gun mounts. Now that it is possible to do so, the concern no doubt will go on with the manufacture of the gearshaft. In this device the gearshift lever is supplemented by a hydraulic gearshifting mechanism housed in a metal case and mounted under the floor of the car at the rear of the gearbox. The gears are shifted through the action of the clutch pedal by setting an indicator lever mounted on a quadrant just under the steering wheel and then pressing the clutch pedal with the foot to the extreme downward position. The gears cannot be shifted when the clutch is engaged. The different shifts are made by oil pressure obtained by a mechanical connection between the foot pedal on the clutch and an oil-filled cylinder on the shaft mechanism. Other details were given in *MOTOR AGE* when the concern was organized, a little more than a year ago.

Lack of time before going to press prevents the description of the various devices to be found at the show, wherein, though not exactly new, features not known to the motoring public in general may exist. Among the entirely new concerns there was the Standex Mfg. Co., which is making an automatic lubricating system for Fords among other things. By this device the owner fills and carries his oil under the seat. A positive gage shows the amount of oil in the reservoir. The device automatically replenishes the oil consumed by the engine.

A New Carburetor

One of the interesting exhibits at the show is the Booty carburetor, made by the Booty Carburetor Co., Chicago. This carburetor is interesting because of its extreme simplicity, both in design and in the performance of the duties required for carburetion. There are no adjustments, even for great changes in climatic conditions, since the functioning is automatic, it adjusts itself for these weather conditions. The illustration shows how the carburetor works. The gasoline first is admitted to the float chamber, E, and the level is controlled by a valve that seats on its upper edge. This eliminates the levers used in other types, necessitated because the valve seats on the bottom edge and the levers are needed to secure a reversal of direction to

seat the valve. The gasoline flows from the chamber E to the passage H.

The illustration shows the throttle partly open, in which position the operation of the engine creates a partial vacuum in the chamber A, causing the control element B to raise. This permits the air to pass in around the cone C, and at the same time the fuel valve D is raised because it is connected to the control element B. As the control element raises the fuel valve D, which might better be called a fuel needle, is raised. This fuel needle has cut in it six slots running longitudinally with the needle, these slots having a maximum depth at the bottom and gradually tapering to nothing at the top. This is what distinguishes this carburetor from the rest. A rich mixture can be secured for starting simply by raising the cone C. This might be said to correspond to the choke on other carburetors, but it cannot be called a choke rightly here because of the difference in operation. It is claimed that in a test made on a large model of this carburetor that first a Liberty engine was operated and then the same carburetor attached to a Ford engine, no adjustments were made, and the operation of both engines was successful beyond mention.

Several new quick-change rims are being exhibited at the show. The old method of tugging, forcing and banging with a hammer, the tire which goes on hard is a thing of the past. With these new-type rims the drudgery of tire changing is reduced to a minimum of time and misspent energy. The Parker Collapsible Rim Corp., Chicago, is exhibiting one of these quick change rims. The illustration shows how easy it is to remove the rim after it has been collapsed, but the act of collapsing is still more simple. The tire simply is raised from the floor, about a foot and then dropped. This causes the rim to collapse inward, as the illustration shows, and removing of the old tire and replacing of the new one is then a simple operation. After the new tire is on the rim is pressed inward with the foot and it then springs into place. Another rim is made by the Lightning Change Rim Corp., Chicago. Its principle of operation is much the same as the preceding one, the collapsing feature being different. The feature of the Lightning change rim is that the old rims of a car can be made into the Lightning rim in a few minutes.

Another new exhibit is the Lenox, one-unit igniter, made by the Carter-Long Magneto Co., Chicago. This is a combined distributor and high-tension coil combined into one compact unit. The combination has eliminated many of the parts so necessary in these two pieces of apparatus when used singly. The number of electrical connections on this igniter varies directly as the number of cylinders. In the illustration, it is seen that provision is made for six connections, which is applied to six-cylinder cars.

A New Lock

Many locks for cars are being shown at the show. A new ignition lock is offered by Barnes & Miller. It is a combination lock, and hence requires no keys. The front plate is the only visible portion of the lock. The operation of starting is accomplished by setting the combination, which is just inside the knurled barrel projecting out from the plate, and then pulling out on the barrel.

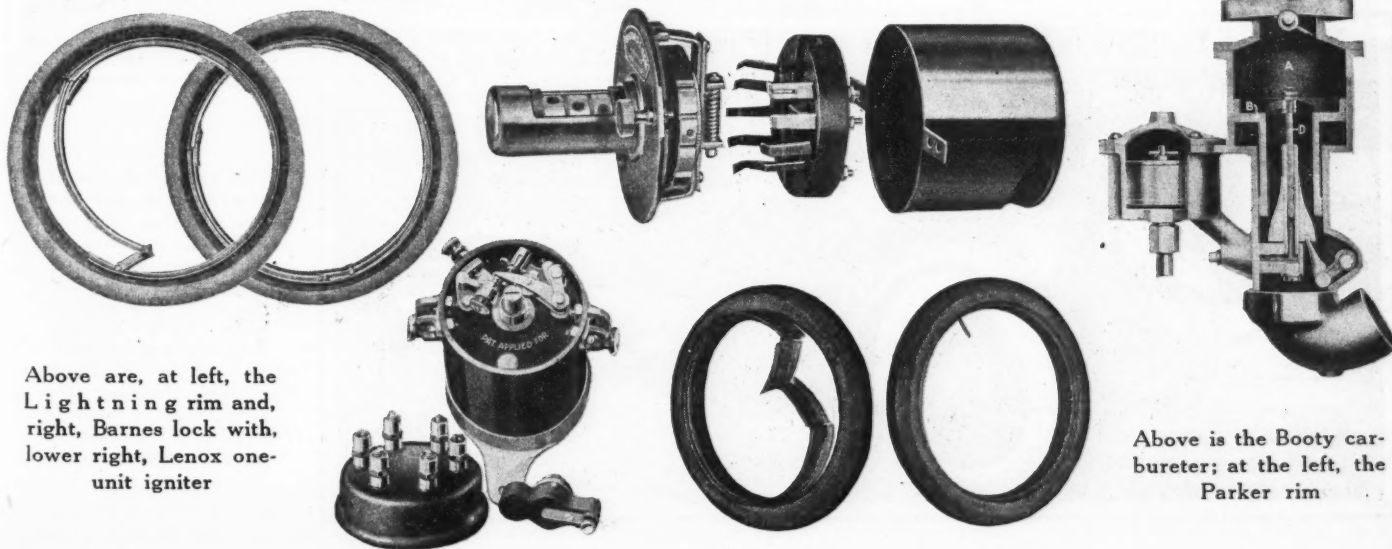
The new Schebler mentioned previously, has been in successful use on many of the Government war machines and for that reason has not been introduced to the public until now. The new carburetor is of the plain-tube type. The feature of the atomization is the compound venturi tube which gives an immense velocity to the air without an undue restriction of the air passage. This compound venturi tube in conjunction with the reserve well of gasoline employed for accelerating purposes represents the principle of operation.

LUCAS TO SOUTH AMERICA

Chicago, Jan. 28—C. J. P. Lucas, for eight years with the Automobile Trade Journal, has resigned and will leave in April to make a survey of South American markets with a view to establishing a house in Buenos Aires and carrying high-grade American passenger cars, tractors and lines of supply for the Argentine, Uruguay, Brazil and Chile.

SHAW IN PRIVATE DISPLAY

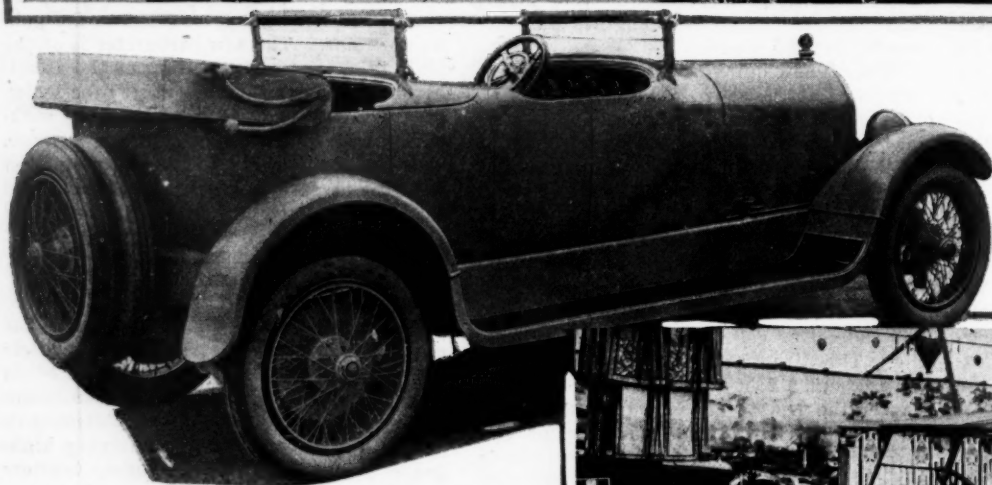
Chicago, Jan. 27—The new Shaw truck, which is the production of the Walden W. Shaw Taxicab Co., is being exhibited on Michigan avenue. This is a $\frac{3}{4}$ -ton vehicle. A 2-ton truck also is exhibited.



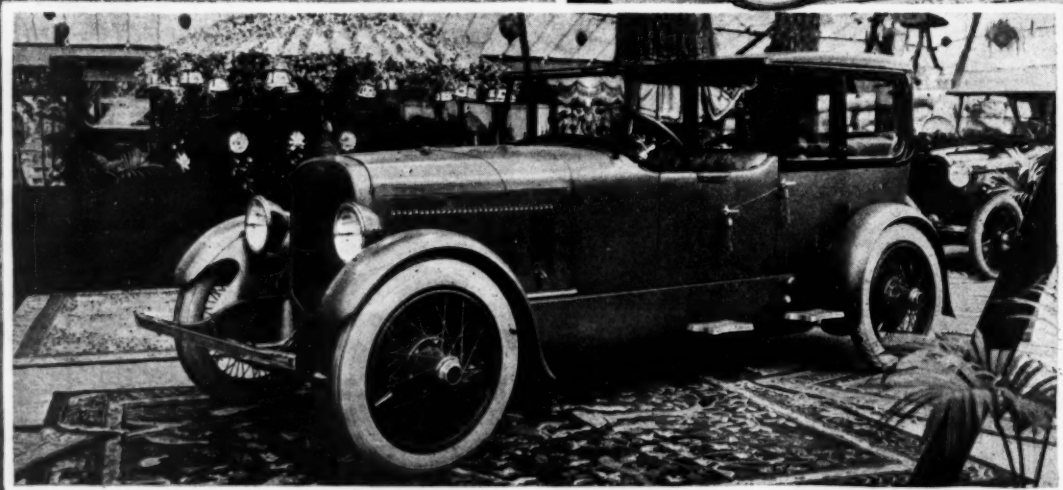
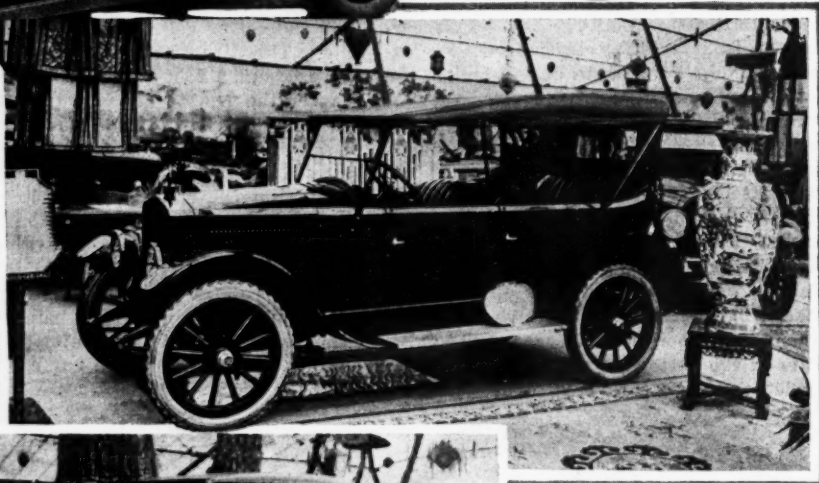
Above are, at left, the Lightning rim and, right, Barnes lock with lower right, Lenox one-unit igniter

Above is the Booty carburetor; at the left, the Parker rim

How Los Angeles Set Stage for Show



Chinese girls dressed in native costume lent local color to the event, which was very much oriental in finish. The use of tents, necessary owing to lack of a suitable building, enhanced this effect as a building could not have done. The truck and accessory tent is shown at the top



The Essex, shown at Los Angeles for the first time at any exhibition, appears in its oriental surroundings just above. Above it is a special body built in Los Angeles and mounted on a Marmon chassis. Another Los Angeles-built body is to the left. This is on a Chandler chassis

Oriental Effects Make Show "Different"

Los Angeles Dealers Use Chinese Tapestry and Screens to Stage Exhibition

LOS ANGELES, Cal., Jan. 24—When the Motor Car Dealers' Association of the Pacific Coast city decided to stage an automotive exposition early in the year they wanted to bring upon the minds of the people the psychological effect of something as far removed from war as possible. The war did not get to China, so it was in China, reproduced as near as \$150,000 worth of oriental decorations and Celestial humans in actual life could do the job, that the show was held Jan. 11-18. The reason for such a lavish display of oriental trappings being a necessary adjunct of a motor exposition was due to the fact that in Los Angeles there is no building of sufficient size to house such a show as the dealers were determined to produce. Consequently, three huge tents were set up, and the almost 150,000 sq. ft. of floor space was converted into the most beautiful decorated event the west coast ever has known.

Wanted to Impress Buyers

Motor car owners and prospective purchasers have heard so much in recent months about the lack of patriotism in the blood of the man who buys new motor equipment that the business of the dealers had come to suffer. A campaign of activities was decided upon as necessary to help the business come back into its own and the show, recently concluded, was the first event. Others are to follow in rapid sequence. Business is to be brought back to normal—there will be no waiting for it to return of its own accord and anything that the dealers can do to start the ball rolling and keep it gliding will be given a thorough trial. The characteristic fighting spirit of the West has been aroused and there will be no admission of defeat, because circumstances for the time being apparently are unkindly disposed to what ranks as the second largest enterprise in California.

It was to make an impression—as the dealers felt they had to get the passenger car back under the skin of the people—that they undertook to put on a show six weeks after the subject was first broached. They realized that it would take something extraordinary in the show line to do this. They were game for the undertaking and expended slightly more than \$30,000 on the show before the doors were opened to the public. But even then and although \$150,000 worth of costly silks and hangings, ivory carvings, bronze vases with spiny dragons were displayed under supervision of the show committee, the individual exhibitors bought, borrowed and rented every bit of Chinese tapestry, floor covering and screens to be had in the city and included that in their individual displays.

In the canvas-shrouded Chinaland the public forgot its trials and tribulations of eighteen months and the old money bag did come out from under the sofa. Not

only was it brought out, but it was made to disgorge to the price of a coveted motor car or truck. Everybody is not a motion picture hero these days; therefore, everybody could not follow the example of a star who wrote a check for \$9,100 and presented his wife with a brand new town car bought on the floor at the show, but many others went as far as they deemed proper. There probably was not one of the more than fifty motor car exhibitors who did not take an order during the show.

But this show was not put on for the immediate result so much as in the attempt to put Old Man Gloom out of existence, and in this it succeeded. There was a picking up of business activity in general before the show had been in progress four days, and department store managers congratulated the show committee on what they had accomplished toward bringing the people back. And this despite the fact that the city was making a terrific fight against the influenza epidemic the week of the show.

The show in itself was a wonderful demonstration of what can be done by dealers along this line. Factory men who attended declared the special equipment on the cars surpassed that ever seen anywhere. Los Angeles top and body builders will not bow to any in the land, and it was in recognition of their capabilities that the car dealers called upon them to display their best. Permanent tops on touring cars, fitted with roller curtains carried within the top featured many exhibits. These curtains are as easy to place at any desired position as is the blind in the window at home. For bad weather they button securely to the car body. They are almost wholly of transparent material so that it is just as pleasant and light within a car thus equipped as when occupying a permanent sedan.

In special bodies the Los Angeles idea was carried even further than ever before. The closed car was tackled this year for

the first time. In the short period of thirty-five days a local body-builder produced a special town car for a Chandler chassis that was pronounced the equal of any body. This car has the distinctive feature of being so low that the top is on the level with the eyes of a person of average stature when standing beside it. This was brought about by underslinging the springs. Yet the clearance was ample and there was plenty of headroom within. A Marmon chassis was fitted with a special four-passenger body that featured a combination of rear cowl and windshield that extended over the side doors.

There was very little shifting in the ranks of the dealers in Los Angeles during 1918 and that accounts for the display of only one new car at the show. The Essex gained that distinction. Other cars were shown for the first time, it is true, but that was not because they had been without representation before. With the exception mentioned, none of the recently announced new cars is represented by a dealer at this time. Nor was there a car of any kind shown that is without an established distributor. Such a remarkable condition speaks well for the solidarity of Los Angeles distributors and the lines they handle. There was not a car displayed that is the product of a financially distressed factory.

Only Two Tractors

Only two tractor models were at the show. That was a disappointment in some respects. It is to be attributed to the fact that the Fordson and Cleveland, those on display, are the only tractors now represented in Los Angeles by passenger car or truck dealers and, therefore, eligible to membership in the dealers' association. Los Angeles passenger car and truck dealers have held aloof from the tractor industry. At present the tractor field is dominated by the farm implement dealer. The motor car dealer seems content to let the implement man have this business and the tractor factories appear satisfied by their representation. There is no question, though, that some day there will come an awakening on the part of tractor factories and passenger car dealers and then there will be a getting together to the mutual welfare of both.

Fifty trucks were in the show, but events of this kind are seldom marked by quick results for the truck exhibitor here. The accessory department was one of the liveliest and best decorated of the entire show. The Ventura Refining Co. reproduced a miniature mountain range and lake of paraffin wax to put over the fact that Ventura oil is paraffin base, the only oil of this kind made from California crude. Standard Oil featured a miniature filling station that was one of the most novel of the many displays and attracted much comment, because of the exact fidelity in reproduction.

SAXON GUARANTEES PRICES

Detroit, Jan. 24—The Saxon Motor Car Corp. has announced that it will protect its dealers against a reduction in the price of the Saxon six. Prices will not drop before June 1, 1919, and probably not then. In case the company finds it necessary to cut prices, the new contract which Saxon purchasers sign calls for an appropriate refund.

100,000 FORDSONS IN 1919

Dearborn, Mich., Jan. 24—Production of 500 Fordson tractors daily within the next ninety days is called for in the new output schedule of Henry Ford & Son. The big tractor plant is turning out 225 completed machines daily and within thirty days will be hitting well above the 300 mark. The 1919 production schedule calls for the completion of 100,000 tractors. This is more than three times the 1918 output, when 30,000 tractors were made and sold.

What the Motor Car Industry Did in the War

By F. E. Moskovics*

Vice-President Nordyke & MacMahon Co.

THE motor car industry was not one of the industries that won the war. It was only a modest contributing factor. We have always felt that there was only one thing that won this war; there was only one factor that actually won it—and that was that line of men that night and day guarded the portals of civilization from Flanders to Lorraine. Any industry or organization or body of men who by innuendo tarnishes the glory of those men even the slightest, by a claim of having won the war, has a tremendous debt which posterity will collect some day.

How Industry Answered Call

I am only going to try to bring out to you how the motor car industry answered the call and how, owing to its close-knit organization, it was enabled to respond quickly to the needs of the Government.

In the early days of the war General Pershing asked the officials at Washington to rush to the A. E. F., first, airplanes; second, tanks; third, gas. Now of these three prime essentials of modern warfare, it was given the motor car industry to produce two—airplanes and tanks. Just think of it! Two of the three most important implements of modern warfare.

In a general way, the motor car industry helped along these two broad lines of transportation—that of the air and land—and for that reason I am going to hold the confines of this talk to just how the forces which marshalled these two means of transportation were organized.

The commercial, or rather the business side of the motor car industry, is represented by the National Automobile Chamber of Commerce. This association comprises every large producer of motor cars in America but one. Immediately on the declaration of war, this organization offered its services to the Government, opened offices in Washington, organized war committees and offered its factories, its organizations and its capital to the President. When the War Industries Board organized its automotive committee, a member of this organization was put in charge. He had to do with all transportation vehicles, so in a sense he was the go-between for the manufacturer and the departments.

Technical Side of Matter

On the technical side, the industry was represented by the Society of Automotive Engineers, who also opened offices in Washington immediately after war was declared. The society was very largely instrumental in furnishing the various departments with the technical men needed. Practically the entire Motor Transport Corps, especially the technical side, was recruited from the ranks of the Society of Automotive Engineers, so immediately war was declared the industry was in splendid shape actually to offer their services. They were perhaps the first industry to present themselves in a body to the various departments at Washington.

* Address before Chicago Association of Commerce, Jan. 23.

To briefly state what was done by the industry in the aerial side, it must be remembered up to the 6th of April there was some little time before effective work was actually done. The interval was used in getting acquainted with the requirements and also with each other.

It was two days before Decoration Day in that fateful year of 1917 that the real birth of America's aircraft took place. On that day a meeting was arranged in Washington between the two best-posted men in America on aircraft matters. Lieut.-Col. E. J. Hall, who actually had more aerial motor experience than any other American engineer, and Lieut.-Col. J. G. Vincent, than whom no one in this country had more experience on details of the Mercedes-type air motors.

At the time of their meeting, each had his own ideas as to what really constituted the ideal aircraft motor. After a few hours with Colonel Deeds, who conceived the plan of getting them together and who placed at their disposal all the data and information furnished by our Allies, these men went to work and then commenced the famous five-day session, locked up in a Washington hotel, that so much has been written about.

Liberty Sketches in Five Days

It was my privilege to lunch with these two men on that day of their first meeting. I spent most of the first two days with them while their minds were getting attuned. That these two men—trained in the motor car industry—knew what was wanted, knew the possibilities of America, is best illustrated by the fact that all their preliminary calculations and sketches were completed in five days. Then another miracle took place. Colonel Vincent took those sketches and data to Detroit and thirty days later appeared in Washington with the first complete ready-to-run Liberty.

The actual first contracts were let in September and in September, 1918, was celebrated the building of the 10,000th Liberty motor.

This is a record unapproached by any belligerent—practically all of which was accomplished by executives, engineers and manufacturers born and bred in the motor car industry.

It is not too much to say that at the time the armistice was signed our aircraft program was the largest, our two-seated planes the best, our fighting motors the best, our equipment and detail the best and our arrangement for repair and maintenance the best—of any belligerent—and all this was done by Army executives trained in the motor car industry and the motor car manufacturers themselves. So much for our contributions in the air.

A year later, or Decoration Day in the glorious year of 1918, an order was received to transport two American divisions 172 miles, and it had to be done in under 40

hr., to support the wavering French line at Chateau-Thierry. It was accomplished in 32 hr., and it was the American motor truck that made possible the wonderful events of those important early July days. Chateau-Thierry—Balleau Wood—all would have been reached too late if American motor trucks in countless thousands had not transported the first division in the nick of time.

Motors Saved Paris Thrice

That the speed of this action saved Paris and was the actual turning point of the war there is little doubt. Thus the gasoline-driven vehicle was for the third time given the honor of saving Paris. First, when General Gallini's gallant army outflanked Von Kluck on their taxi expedition out of Paris. Again at Verdun, when a perilously thin line of communications was kept open by the French camions, many thousands of which were American-built, and again at Balleau Wood.

Now, the organization that made all that work possible was developed almost in its entirety from the motor car industry. Gen. Chauncy Baker, who at that time was in active charge of the Motor Division of the Quartermaster Corps, worked almost daily with the officials of the Society of Automotive Engineers, and later when the standardized trucks were decided on another beautiful example of patriotic co-operation was displayed when seventy-five motor truck engineers, representing substantially every reputable producer of trucks and truck accessories or parts, joined hands and brains and designed and supervised the building of the first model of the complete line of standardized military trucks. The first trucks were put on the road in truly incredible time.

Motor Men at Head

Later, when a civilian board was decided on to supervise the building of this truck and other transport material, Christian Gird was selected to head it. The motorizing of artillery—a new artillery department which, as later events proved, was tremendously valuable for rapid transport of guns—was under a motor car engineer. Lieut.-Col. W. G. Wall, as well as all the development work being done by the motor car industry.

The design and building of tanks was under Colonel Alden, a motor car engineer, and the industry did the work and so it went.

A roster of the things designed and built by the motor car industry would be to catalog the needs of an army, and the great outstanding feature of it all is that no industry responded so quickly, was mobilized so easily and worked more effectively than this industry.

The commercial side was represented by the National Automobile Chamber of Commerce, the technical, by the Society of Automotive Engineers. Led by these, the manufacturers followed—how well you can judge yourself.

To the public of America the motor car industry owes much; owes its life and strength, its virility—but we feel that debt has been at least partly paid. When the call came, we were ready. Our men and machines were at attention, and the entire industry feels a real pride and real joy at a job well done and, when the truth is really known, without a single blemish. No real case of flunk, no abandonment of duty, no profiteering—just a high sense of duty and a job well done.

In brief, the motor car industry gave to America—

The best motor that ever flew the air. The organization and men to design, produce and man it.

The best motor trucks used by any belligerent and the men to design, produce and operate them.

Besides a myriad of smaller articles—and all this in incredible time.

It was only possible because of the healthy, sound liquid state of the industry. From an artistic standpoint, the war ended all too soon. What had been accomplished

was as nothing to what was coming, although the air program suffered much from over-publicity. Although darkening the skies of Germany was a literary fiction, yet with thousands of planes overhead to harass the enemy, to bomb his cities and military posts—with thousands of trucks to rapidly transport and feed our matchless army—with thousands of tanks to pave the way for their heroic deeds—then indeed would have the industry have shown even more importance—even more power than was shown.

GOODYEAR METHODS UPHELD

New York, Jan. 24—The method of the Goodyear Tire & Rubber Co. in doing business with its dealers and in refusing to sell to those who will not maintain its resale prices is legal, according to a decision by Judge Hand rendered late last week. H. P. Baran, a Goodyear dealer, filed suit against the Goodyear Tire & Rubber Co., claiming infringement of the Sherman and Clayton laws. He alleged that Goodyear conspired to obtain a monopoly and re-

strain trade and commerce in their tires, that they selected the dealers who should sell their tires, forbade them to sell other dealers and instructed them to sell only at the prices and terms fixed, under penalty of forfeiting their position as Goodyear dealers.

Counsel for the Goodyear company pointed out that the company's object was to protect the public and insure their getting maximum service from Goodyear products. Judge Hand ruled that the Goodyear method is legal, stating that the selected dealers could do as they pleased with the merchandise, that there was no agreement among dealers to fix prices or restrict sales and that the principal point at issue was whether the Goodyear company was within its rights in attempting to prevent price-cutting by refusing to sell to dealers who did not maintain the suggested prices. No decision to which he was referred, said Judge Hand, "prevents a single trader from rejecting a customer because he did not like the prices at which the customer resold."

Lenses That Shatter Without Eye Injury

SUPPOSE you were talking goggles to a healthy, clear-eyed business man who looked perfectly sane, and he suddenly produced a 2-lb. monkey wrench and a pair of goggles with the request that you put on the latter and smash them with the wrench. Would you have ducked? That's what I did.

Thereupon, the aforesaid business man adjusted the goggles over his own eyes and hit one of the lenses a smashing blow with the wrench, such that pieces of glass fell in showers to the floor. So far as I could determine, no other effect was produced.

Investigation of the remains of the lens showed that it had been made of two parts—the outer one of highly polished glass and the inner one, of a very transparent, resilient and seemingly unbreakable mate-

rial which not only prevented the shattered glass from reaching the eye and face but which was not even dented. These two material are not cemented together but are held by waterproof adhesive tape, so that there is no chance of parting through unequal expansion and distortion which might result from the use of cement between two or more planes in a built-up lens is eliminated. The two planes bound by the adhesive are held in a light metal frame, which operates on the same principle as a motor car snap rim.

These goggles, designed for aviators, with whom the hazards of injury from broken goggles is greatest, are called the Uhlco Bi-plane goggles and are the product of the Uhlemann Optical Co., Chicago. The aviation goggle, in addition to the injury-prevention feature, has several points

which would recommend it to the sporting motorist or long-distance tourist.

It is designed for the double purpose of protection and comfort, and to that end the lenses are carried in a soft leather mask which covers nearly half the face and is edged with fur. Means for indirect ventilation are provided, and the mask is so made that it conforms exactly to the contour of the face. Several times aviators wearing these goggles have been in accidents in which the lenses are shattered, but in no case have the eyes been injured.

A feature of greatest value to the aviator which also will be appreciated by the motorist is the great visual field of the goggles. This is within 10 deg. of a complete semi-circle and is made possible by the unusual area of the lenses, as well as the fact that they are at an angle with one another. The aviation goggle comes in a neat case made of rubberized khaki cloth and sells for \$15. Either white or amber-green lenses are provided. When desired, the lenses may be had ground to prescription, so that the necessity of a pair of glasses is obviated.

The belief that the features which make this design advantageous in aviation are equally desirable in a motorist's goggle has led the manufacturer to begin the development of a lighter and less expensive design for tourists. These, it is expected, will be on the market in a short time.

TRACTORS NEEDED IN GREECE

Washington, Jan. 25—Greece is suffering from a shortage of farm machinery, particularly tractors. The Government has placed an order with an American company for fifteen motor plows and 200 tractors fully equipped with plow, harrow, hoe and thresher. Greece is cultivating more than 1,300,000 hectares—1 hectare equals 2.47 acres—of land and has at its disposal only 160 threshers, 1200 reapers, 100,000 plows and no tractors.



Uhlco Bi-plane goggles before and after the hammering

Serial Numbers of Passenger Cars

Motor Age Maintenance Data Sheet No. 23

One of a series of weekly pages of information valuable to service man and dealer—Save this page

HOLLIER

Year	Model	Cyls	Price	Serial Numbers
1915	.....	..	....	1-800
1916	8	8	\$985	801-1300
				A1-A1000
				B1000-B1400
1917	186	6	895	1000 up
	178	8	1185	Number on heel board of front seat
1918	200	6	1485	1000 up
	188	8	1285	

HUDSON

Year	Model	Cyls	Price	Serial Numbers
1912	33	4	\$1600	15001-30000
1913	37	4	1875	30001-56500
1914	6-40	6	1750	56501-77201
	6-54	6	2250	
1915	6-40	6	1550	73501-9000
	6-54	6	2350	G10001-G40000
1916	6-40	6	1375	H1-H99999
1917	H	6	1650	Number on heel board below driver's seat
1918	M	6	....	A5000 A39999

HUPMOBILE

Year	Model	Cyls	Price	Serial Numbers
1912	16-20	4	\$750	25001-28902
	20	4	900	
1913	C & E	4	750	28903-40000
	H	4	975	
	....	4	1175	
1914	H	4	1050	40001-52000
1915	K	4	1200	52001-60000
1916	N	4	1085	60001-75000
	NV	4	1225	
1917	N	4	1185	75001-87519
				Number on dash plate
1918	R	4	1250	R1 R15000

INTER STATE

Year	Model	Cyls	Price	Serial Numbers
1912	30-32	4	\$1750	4101-6000
	40-41-42	4	2400	
	50-51-52	4	3400	
1913	45	6	2750	6001-7099
1914	....	..	....
1915	T	4	1000	7100-11503
1916	T	4	850	11504-14528
1917	T	4	850	14529-19108
1918	T	4	1000	19109 up
				Number on plate under front seat cushion

JACKSON

Year	Model	Cyls	Price	Serial Numbers
1916-17	349	8	\$1295	20700-21916
	350	8	1195	20243-20587
1917-18	349	8	1495	21916-21989
	350	8	....	20587-20634
				Prior to 1916 the numbers used do not actually designate the year of manufacture

JEFFERY

Year	Model	Cyls	Price	Serial Numbers
1913	42 H. P.	4	\$1700	31551-35999
1914	38	4	1550	40000-46999
	48	6	2250	38000-38999
1915	Six	6	1650	47000-53999
1916	4-62	4	1000	57000-60500
	6	6	1350	68000-69500
1917	472	4	1095	61000-78000
	671	6	1465	86000-96000
				Number to left of front frame cross member
				For later models see Nash

JONES

Year	Model	Cyls	Price	Serial Numbers
1915	1915	6	\$1150	
1916	1916	6	995	
1917	26A	6	1675	
	26B	6	1675	
1918	27A	6	2100	
	27B	6	2100	
	27D	6	2000	
	28E	6	2350	

JORDAN

Year	Model	Cyls	Price	Serial Numbers
1917	60	6	\$1650	151-2155
1918	60	6	1995	3651 up

KING

Year	Model	Cyls	Price	Serial Numbers
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1912	36	4	\$1565	100-550
1913	A	4	1350	600-999
1914	B	4	1095	1000-2200
1915	B	4	1075	2201-3005
	D	8	1350	
1916	D	8	1150	5000-8000
	E	8	1585	12000-14950
1917	EE(1st series)	8	1585	16000-17800
	EE(2d series)	8	1585	18000-18099
1918	F	8	....	20001 up
				Numbers on dash plate, except 1915 model, which are on heel board under front seat

KISSEL

Year	Model	Cyls	Price	Serial Numbers
1912	30	4	\$1500	
	40	4	1850	
	50	4	2350	
1913	LD13	4	1700	
	H13	4	2000	
	D13	4	2500	
1914	40	4	1850	
	48	6	2350	
	60	6	3150	
1915	4-36	4	1450	
	6-42	6	1650	
1916	32-4	4	1050	
	36-4	4	1250	
	42-6	6	1485	
1917	100 pt. 6	6	1195	
	6-42	6	1650	
	Dbl. 6	12	2250	
1918	100 pt.	6	1295	
	Dbl. 6	12	2250	

KLINE

Year	Model	Cyls	Price	Serial Numbers
1915	6-42A	6	\$1750	2100-2500
1916	6-36E	6	1095	3000-3599
1917	6-38F	6	1295	3600-4500
	6-38G	6	1395	4600-4999
1918	6-38GA	6	1495	5000-5800

LENOX

Year	Model	Cyls	Price	Serial Numbers
1912	AB BB			
	CB DB	4	\$1800	100-215
1913	AC DC	4	2000	1000-2000
	MC	6	2750	15-1525
1914	A D	4	2000	2000-2015
	M	6	2465	1525-1550
1915	A1 D1	4	2000	2015
	M1	6	2465	1551-1563
1916	O	6	2500	2500
1917	O	6	2510	2530
1918	Ser 33	6	2550	2554

LEXINGTON

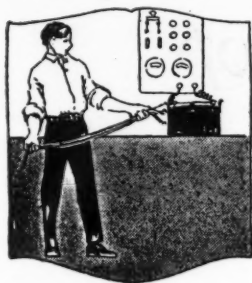
Year	Model	Cyls	Price	Serial Numbers
1912	F	4	\$1775	
	D-F	4	1750	
1913	D-F	4	1750	
	G	6	2500	
1914	4-H	4	1335	
1915	4-K	4	1375	
	6-L	6	1875	
	6-M	6	2575	
1916	6-N	6	1875	
	6-O-16	6	1075	
1917	6-O-17	6	1185	1285
	6-P	6	2875	
1918	O	6	1345	
	R	6	1585	

LOCOMOBILE

Year	Model	Cyls	Price	Serial Numbers
1912	L	4	\$3500	
	M	6	4800	
1913	L	4	3600	
	R	6	4400	
	M	6	5100	
1914	38 RD & LD	6	4400	
	48 RD & LD	6	5100	
1915	38R-5	6	4400	
	48M-5	6	5100	
1916	38	6	4400	
	48	6	5100	
1917	38	6	4600	
	48	6	4600	
1918	38	6	5000	
	48	6	5950	

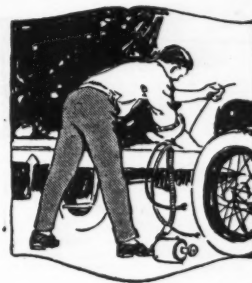
MAIBOHM

Year	Model	Cyls	Price	Serial Numbers
1917	A	4	\$830	1-500
1918	B	6	975	501-2250



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the 131st installment of a weekly series of articles begun in MOTOR AGE, issue of June 29, 1916, designed to give the repairman and motorist the knowledge which will enable them to care for and repair any and all of the electrical features of the car, no matter what make or model it may be.

The first half of this series has been published in book form by the U. P. C. Book Co., Inc., 243-249 West Thirty-ninth street, New York, and is sold at \$2.50. The remainder of the series will be published as a supplementary volume.

Part CXXI—Bijur Electrical Systems

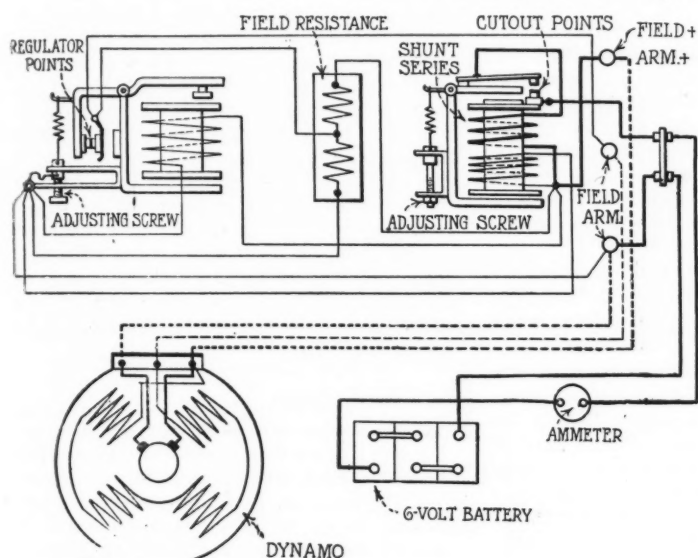


Fig. 672—Internal connections of Bijur combined electromagnetic cutout and regulator mounted on top of the electrical unit

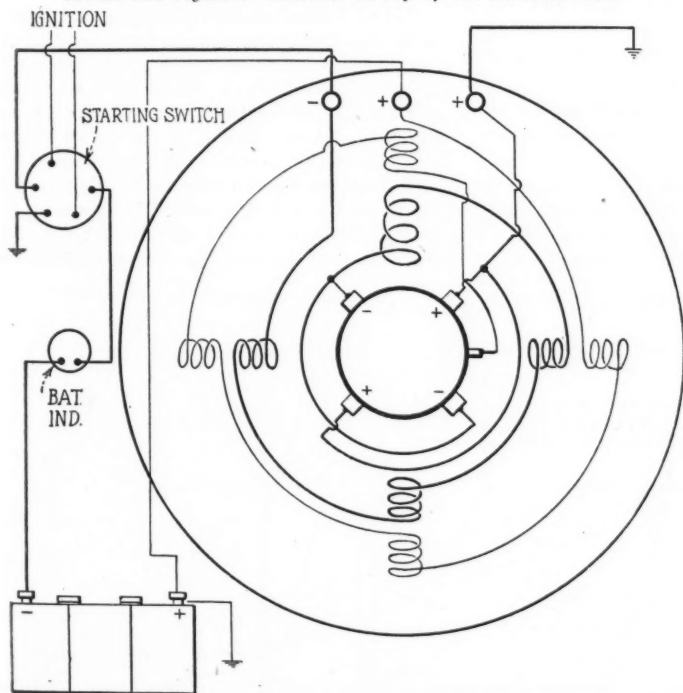


Fig. 674—Internal connections of Bijur combined generator and motor unit with generator regulation—a combination of third-brush and bucking methods

THE two wires which connect the generator and battery are soldered into the terminals of this plug. This plug is made in either of two ways, with two flat parallel faces or round and knurled on the portion extending into the shell which it fits. The plug may be turned a quarter revolution in either direction from the position it has when it enters the receptacle, and when rotated to either of these positions and allowed to spring outward under the influence of a compressed spring it will be locked in place. Pressing it in and turning to the other extreme position reverses the connections and causes the polarity of the generator to change. The manufacturer recommends that the position of the plug be changed about every 500 miles. It is not advisable to change the plug unless the storage battery is practically fully charged.

Combined Starting Motor and Generator

The internal connections of the combined starting motor and generator unit are shown in Fig. 674. It is a compound-wound four-pole machine with a round frame, and the output of the unit when operating as a generator is regulated by a combination of the third-brush and differential or bucking series field types of regulation. No automatic cutout is used with this machine, but it is connected permanently to the battery while the engine is running.

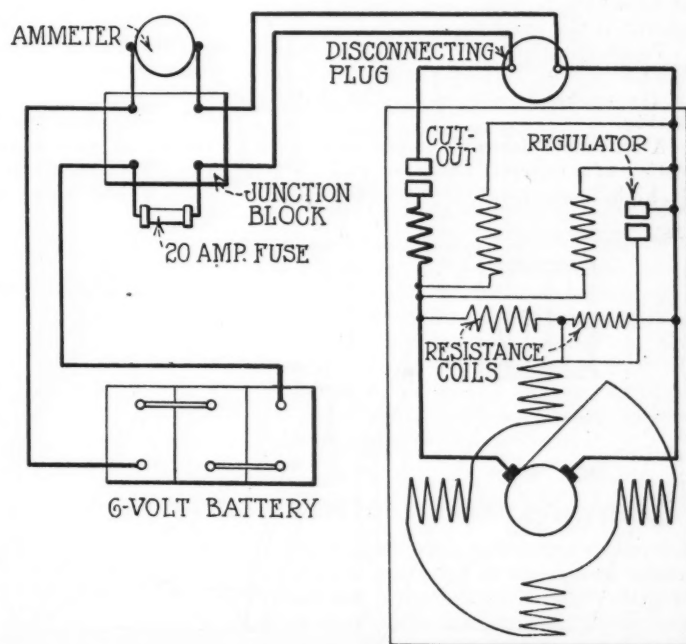


Fig. 673—Internal connections of Bijur combined electromagnetic cutout and regulator mounted inside the housing of the generator

The Motor Car Repair Shop

Practical Maintenance Hints

Washing a Motor Car

To wash a car well in minimum time demands adequate equipment. It is not enough to have first-class workmen. If the equipment is not the best, either time will be wasted or inferior results will be obtained.

The first essential is a good washrack. It should be roomy and well drained. It should be about 15 by 20 ft. and have a slope toward the drain hole in the center of $\frac{1}{2}$ in. to the foot.

The position of the washrack is important. It should not be placed in the aisle if much day washing is done. With night washing it may cause no difficulty to have it at the end of the aisle. On the other hand, if most of the washing is done in the day time, it is feasible to make this space do double duty—as a washrack in the day time and as storage space for two cars at night. Hence, it is desirable to make the washrack 15 ft. wide, which is ample for storing two cars. In fact, it is good practice, regardless of when the washrack is used, to make it 15 ft. wide and facing the aisle so that whenever it is not in use it may be employed for car storage.

Where Light Is Best

It should be located where light is best, if used in the day time. At the same time it should not be placed near the garage entrance if the winter climate is cold, as the continual opening of the big door will make washing in the vicinity uncomfortable.

For the sake of good light and ventilation and to confine the splashing water it is advisable to locate the washrack in the corner of the building, A, Fig. 1.

To confine the water and dirt a concrete bead 2 or 3 in. high on the two open sides of the washrack may be used as shown at B, Fig. 1.

A still more desirable improvement, consisting of a concrete partition wall about 3 ft. high, is shown at C. This helps greatly

in confining the water and preventing adjacent cars from being splashed.

The most satisfactory design, however, is the use of a thin partition placed along the third side, shown at D. This wall need not necessarily extend to the ceiling but should be 6 or 8 ft. high. It may be constructed of thin hollow tile made especially for building thin walls of this sort.

The so-called traveling washrack has much to recommend it, and while it is still a novelty it appears to be superior to the usual type such as those just described. It was originated in that mammoth New York garage, the Hudson. Each broad aisle is divided into squares with a drain in the center of each square and the sides of the square sloping slowly toward the center so that to place any car on the washrack means simply to push it forward out of its berth into the aisle.

Instead of having a separate overhead washer, lights and other necessary equipment for each of these squares, this equipment is hung from an overhead platform which slides up and down the aisle on two rails, suspended from the ceiling.

Brilliant lights which focus directly on the work are mounted at the four corners of the platform, and from it may be hung a rotary overhead washer of the usual type or, a convenient compromise, two lengths of hose, each hanging from diagonal corners. Curtains are hung at the sides so adjacent cars will not be splattered, but the ends are left open for convenience, light and ventilation.

Water and electric connections are made conveniently at a nearby post.

This washer is suited particularly for night work, when traffic in the aisle is very slight.

It minimizes the handling inasmuch as the car is only moved from its space into the aisle instead of being transported to some distant point, and it practically elim-

inates damaged fenders and other car blemishes which are incident to pushing or driving the car to the washrack and back again. Practically all complaints from owners will vanish if the movement of cars is limited, as it can be limited only by the use of the traveling washrack.

For any type of washrack, traveling or stationary, a rotary overhead washer is advisable. For the man who desires to build his own, the design in Fig. 3 is offered as simple and at the same time quite satisfactory. The hose is carried on a triangular member hung from the ceiling, which allows the hose to be swung through a circle. The hose is looped generously under the center of rotation so that continuous use will not flex it unduly. Thus by the simple expedient of looping the hose the need for an expensive and troublesome joint at this point is done away with. To prevent undue twisting of the hose a stop is provided so that the swinging arm of the washer cannot be swung through more than one revolution.

Turning on Water

The water is turned on through the operation of a valve mounted on the ceiling and closed by a spring. A small cable runs from the lever on this valve over two pulleys, as shown by the dotted line, and is connected to the lower end of the hose in such a manner that a pull on the hose automatically opens the valve.

The sediment which collects on the washrack frequently settles in the drain and causes trouble. To eliminate this difficulty it is well to have a sediment pot incorporated in the construction of the drain. Fig. 4 shows the idea. The pot may be an ordinary garbage pail, so the hole should be just large enough to receive it snugly, the top of the hole being closed by a cast-iron cover. The water runs off through a drain pipe at one side, and the sediment falls to

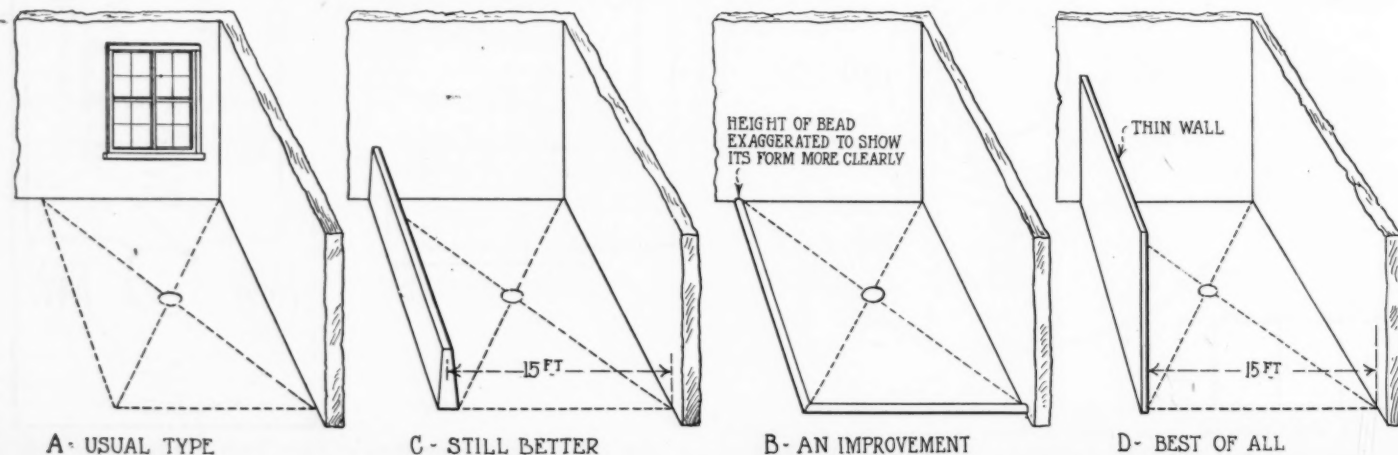


Fig. 1—Four ways of arranging washrack in a corner of the garage, showing the best

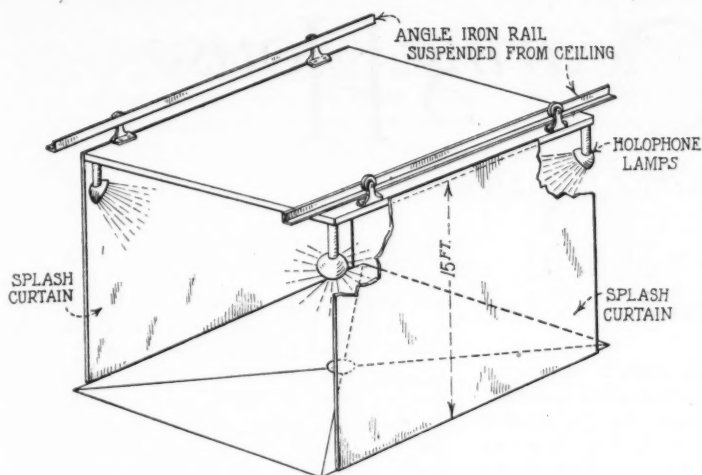


Fig. 2—Traveling washrack which originated in the New York Hudson garage

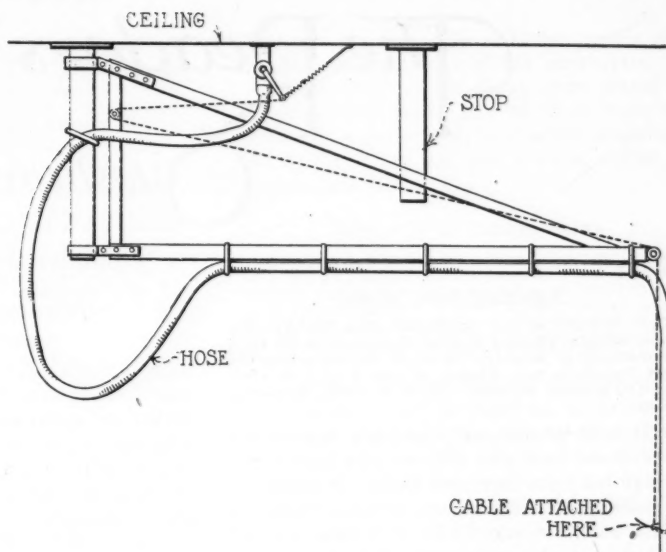


Fig. 3—Right—Rotary overhead washer which can be used for any type of washrack

the bottom of the can, which may be emptied as often as necessary.

The lighting of the washrack is very important, as good work cannot be done with poor light. The electric lamps shown in the illustration of the traveling washrack, Fig. 2, are very satisfactory. Clusters of lights on a portable stand are also good. Another good idea is to mount a row of lights in a white-painted board, Fig. 5, and suspend this from a pulley in the ceiling so that the lights may be hauled up out of the way when not in use. Fig. 6 illustrates a similar idea in effect, but in this case the lights are mounted permanently along the wall and are protected from damage by fine chicken wire. Obviously, there are many variations of these lighting suggestions.

White-painted walls are advisable for the washrack to conserve light. This suggestion is particularly feasible with the thin-wall type, D, Fig. 1.

Hose equipment should be kept in good condition, and the stream of water should be ample. A small stream is a time waster.

There should be separate sponges and chamois for the car body and the running

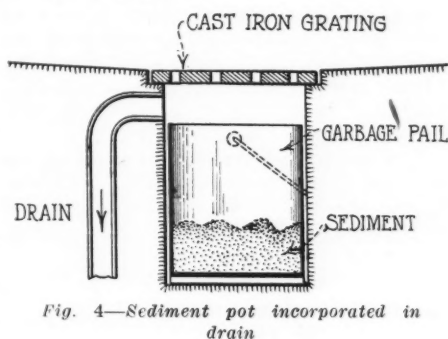


Fig. 4—Sediment pot incorporated in drain

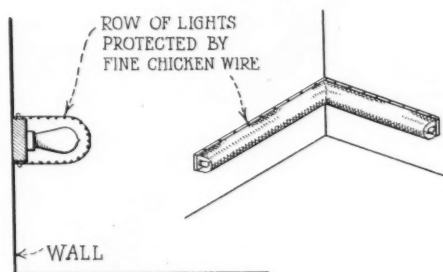


Fig. 6—Lights mounted permanently along the wall and protected by chicken wire

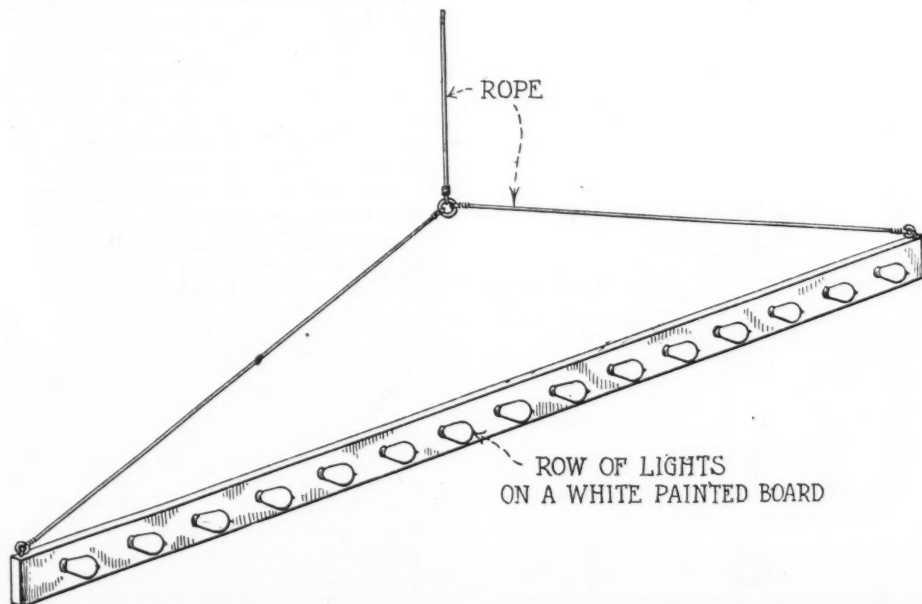


Fig. 5—Lights mounted on a board painted white and suspended from the ceiling by a pulley

gear, and under no circumstances should the one be used on the other.

For comfort in cold weather provision should be made for tempering the cold water with warm as it issues from the hose. In other words the hose should be connected to cold and warm water supplies so that the exact temperature required can be obtained without difficulty.

A special coal hot-water heater will be found the most economical and satisfactory method of obtaining hot water in quantities, but gas heaters, or a hot-water back in the furnace, also may be used.

Ford Theft Preventive

A traveling salesman using a Ford with a permanent and rather generous sample case box on the rear deck drove up in front of a motor car establishment. He did not put a chain through the spokes of his wheels, nor did he have a steering wheel that could be locked into a neutral position. He deftly removed the cover of his coil box, removed the four coil units, placed them in the sample case box on the rear deck, locked the doors with a padlock large enough to hold a stable door and proceeded about his business with the absolute knowledge that his car was safe unless it should be towed away.

To Cure Grabbing Clutch

When a leather-faced clutch grabs—does not engage smoothly—clean the surface of the leather with kerosene and then apply neatsfoot or castor oil to the surface to soften the leather, thus insuring easy engagement. If the clutch slips, clean the leather with kerosene to remove any excess oil. If slipping still continues, sprinkle Fuller's earth on the surface.

Battery Overcharging

The man who uses lights and starter very little but does a lot of high-speed touring should see to it that he is not feeding too much current to the battery. Most lighting systems have an adjustment for this purpose, and if so, the car should be taken to the service station and the change made.

The Readers' Clearing House

Questions and Answers

Conducted by B. M. Ikert

Miscellaneous

Applying New Wheel

Q—I have a car equipped with 34 by 3½ wheels which I desire to change to 32 by 4 demountable wheels. Will it be necessary to get complete new wheels or can I fit new rims on the present wheels?—A. B. Harvey, Emporia, Kan.

It will be necessary to have the wheels cut down and new felloes and bands put on to take the new size rims. It might be possible to secure wheels already built up, with bands to take 32 by 4-in. rims, so that all you would have to do would be to fit the new wheels to the old hubs.

Applying Sliding Gear Transmission

Q—Publish address of one or more manufacturers or agents near here that make or handle sliding gear transmission for Ford motor cars.

2—Would you advise placing one on a Ford, especially for mountain use?

3—In lengthening the wheelbase on a Ford would you advise one to use two universal joints or to lengthen driveshaft?—S. Gale Abbott, Oakland, Cal.

1—This is made by the Tractor Train Co., 1346 Wall street, Los Angeles, Cal.

2—It will give you four speeds forward instead of two, which is most desirable in mountain work. One is lower than the high on the Ford, and one is higher than the Ford high, so you will have a good range of ratios.

3—It will depend upon how the wheelbase is lengthened and where the frame is split, if this is the procedure. If you lengthen the driveshaft, it calls for a longer torque tube, and perhaps this would be the simplest way. The tube can be lengthened by inserting another piece of steel tubing, the right length, and having this welded or brazed. By using two universals it will require even more work, for the end of the torque tube must be supported, and this will mean a new cross member. Eliminate wearing parts where it is possible to do so.

Adjusting Cadillac Parts

Q—Give instructions for adjusting clutch on 1916 Cadillac.

2—Give instructions for adjusting steering gear.—Herman Centlivre, Fort Wayne, Ind.

1—There is no adjustment to a Cadillac clutch; it is self-adjusting so long as the spring maintains its true tension. But after a car has been run for some time it may be found that the facing on the clutch disks have become compressed or worn to some extent and that, consequently, the clutch pedal strikes and holds the clutch from engaging properly. When this condition exists adjust the rod connecting the clutch pedal with the arm on the clutch release shaft so that the clutch pedal has a movement back and forth of 1 in. without disengaging the clutch. If this does not remedy your trouble—slipping clutch, presumably—then it means a new clutch spring or new driving disks, those that are faced with friction material.

2—Two principal adjustments are provided, the first being to take up the end play in the worm K, Fig. 1. When this

occurs loosen the jam nuts J in Fig. 2 and lock screws A. Then with a screwdriver or something else that is suitable turn the adjusting collar L, Fig. 1, which can be seen through the hole from which the plug B, Fig. 2, was removed, until the proper adjustment is made. Lock screws A are positioned in the steering gear housing so that when one is directly over a slot in the adjusting collar the other is between two slots. Therefore, after adjusting the collar it will be necessary to select the proper screw for locking the adjustment. Both/lock screws should be held from turning by locking the jam nuts.

The second adjustment is for taking up wear on the teeth of the worm, L, in Fig. 1, and the sector W. The sector W has its bearing in an eccentric steel bushing,

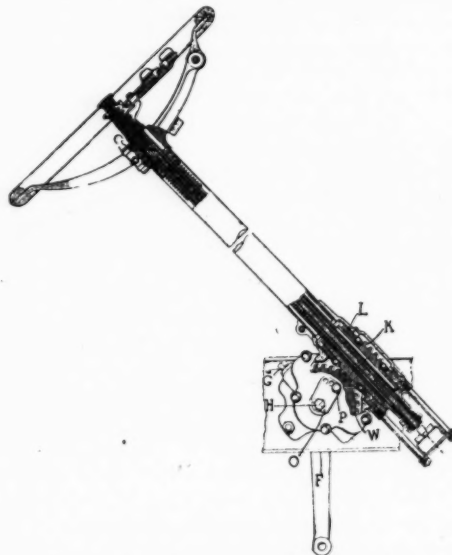


Fig. 1—Steering gear on Cadillac, showing worm and gear

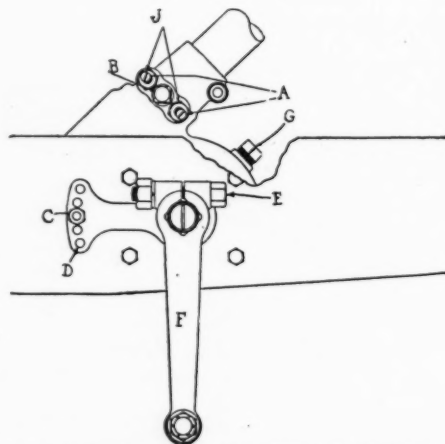


Fig. 2—Points of adjustment on Cadillac steering gear

and should wear occur it may be taken up by turning this bushing so it throws the sector closer toward the worm. To do this proceed as follows: First, remove the locking screw C, Fig. 2, then move the arm D, thereby turning the eccentric bushing until the play between the teeth of the worm and the sector is taken up. If the wear on the teeth of the worm and sector is very great, it will be necessary to remove the steering arm F and to place the arm D in a different position on the hexagonal end of the eccentric bushing to bring the arm D in position so it can be locked by the screw C. After the adjustment is made properly be sure the lock screw C is replaced and tightened.

An adjustment is provided on the inner face of the steering gear housing for taking up end play in the sector shaft. To make this remove the locking arm O, Fig. 1, and turn the adjusting screw in until the proper adjustment is made, after which the locking arm O should be replaced and the lock nut P replaced and tightened.

Action of Differential

Q—I have a Chalmers 6-30 1917 model and some time ago was adjusting the brake bands and had the rear end jacked up. When I turned one of the wheels by hand I noticed that the other wheel would turn in the other direction. Please explain. The other day I had the rear end of the car jacked up preparatory to cleaning off the mud and gum from the brake bands and I noticed when I turned either of the rear wheels the other wheel would not turn. With the car jacked up I started the engine and found that only one wheel was turning, the left one, and the other wheel would move about 2 in. with a jerking movement. I could stop this wheel with my hand. There is no noise of any kind. What is the trouble?—J. E. Newman, Bloomington, Ind.

There is probably no trouble at all with your car, except that your brakes may be slightly tight, which is the reason for your right wheel moving in the manner it does. Your difficulty is in the understanding of the operation of the differential. Referring to Fig. 3, R is the ring gear which engages with the pinion E, the pinion E being driven from the propeller shaft P. The ring gear is attached to the spider housing H as shown, so that when the ring gear turns, the spider turns with it, and since the gears B and D are pivoted in this housing, as can be seen from the sketch, they will turn with the housing, but not upon their own axis. The gears B and D being carried around with the housing will in turn carry with them the gears A and C, which are attached to the square end of the driveshaft S.

Suppose that the left wheel is turned by hand in the direction of the arrow. If the right wheel is free to turn, it will turn in the opposite direction to the left wheel, because the motion of gear A is transmitted to gear C through the gears B and D, which act only as idler gears in this case. Idler gears always reverse the direction of rotation. If the right wheel is not free to turn,

which is probably due to a tight brake, the motion of A will be transmitted to the idlers. C being stationary, the idlers will turn around the gear C, carrying the housing with them and thus turn the propeller shaft.

Using Ether in Gasoline

Q—How much ether should I use in the gasoline for my 1916 valve-in-the-head and overhead camshaft Chalmers?

2—Where can I get a large valve for this engine?—Fred Bunte, Rock Rapids, Iowa.

1—Ether is a dangerous thing to handle and will do your engine no good by continued use. As a matter of fact, our advice is to leave it alone; it corresponds to the drug habit. Ether is purchased, generally in tubes. It should be placed on ice for 10 hr. before handling. Heat from the hand is apt to cause it to explode and you may be injured. Where it is used it is customary to mix 1 oz. of ether to 5 gal. of gasoline, but this may have to be varied a trifle for the best results. By no means buy ether that comes in cans—use only that found in tubes, if used at all.

2—You cannot put a larger valve in the cage of this engine. It is made as large as possible, and the cage will not take a larger one.

Underslung Frames and Steam Turbines

Q—Give advantages and disadvantages of the underslung frame.

2—Why is it not found on more of the modern cars?

3—Is a steam turbine reversible?—John R. Blake, Rolling Prairie, Ind.

1—The chief advantage of an underslung frame, similar to those used on the American and Regal cars some years ago, is that because all parts and the load were so low the center of gravity was materially lowered, thus tending to eliminate to a large extent the likelihood of capsizing, and it is true this argument held perfectly good in practice.

2—Probably because of the additional cost of manufacture, for it is undoubtedly a fact that such construction did cost more. The underslung frame did not permit as easy access in case of repairs, and this also may have tended to mitigate against extreme popularity.

3—No. The construction of the blades does not permit of reversing but external mechanical means may be used to reverse a turbine.

Backlash in Driveshaft

Q—I have a four-cylinder 1916 Scripps-Booth car. There is backlash at the end of my driveshaft, also side play. When I throttle down below 15 m.p.h. I get a jerking in the car. Where should I take up this play?

2—How can I get off the hubs of the Houk wire wheels? I can get the wheels off, but not the hubs. Do I need a wheel pulley?—William Clever, Washington, D. C.

1—Backlash usually develops most severely in the universal joint bushings, which are easily removed and replaced with new ones. A very slight adjustment of the driving pinion, however, will take out a large part if there is play at this point. This adjustment is made immediately forward of the differential housing, by loosening the locknut and turning the adjusting collar to the right to tighten. This requires care, for it must not be made too tight, else it will bind and will hum. It is usual to make it just tight enough so a cigaret paper can be run between the gears without destroying the paper and yet so

TO assist readers in obtaining as a unit all information contained in this department on a certain subject MOTOR AGE segregates inquiries into divisions of allied nature. Questions pertaining to engines are answered under that head, and so on.

MISCELLANEOUS

A. B. Harvey.....Emporia, Kan.
S. Gale Abbott.....Oakland, Cal.
Herman Centlivre.....Fort Wayne, Ind.
J. E. Newman.....Bloomington, Ind.
Fred Bunte.....Rock Rapids, Iowa
John R. Blake.....Rolling Prairie, Ind.
William Clever.....Washington, D. C.
Ralph Seger.....Sherwood, S. D.

ENGINES

J. O. Selbert.....Frankford Heights, Ill.
Joseph Schwickrath.....Stratton, Col.
Elmer Copeland.....Libertyville, Iowa
P. R. Gibson.....St. Paul, Minn.
Herman Centlivre.....Fort Wayne, Ind.
J. F. Hall.....Chicago
Ray McNay.....Cincinnati, Ohio
R. F. Jackson.....Minneapolis, Minn.
O. C. Gould.....Fort Worth, Tex.
Edgar Gifford.....Chicago
E. A. Hamilton.....San Jose, Cal.

THE ELECTRIC SYSTEM

W. F. Werner.....Dafne, Sask.
W. M. Maggart.....Kokomo, Ind.
S. E. Sanderson.....Town Creek, Ala.
C. D. Meyer.....Seattle, Wash.
W. H. Ulrick.....Miller, S. D.

CARBURETION

Herman Centlivre.....Fort Wayne, Ind.

REBUILDING

E. E. Thompson.....Melvin, Ill.
J. F. Hall.....Chicago

No communication without the writer's name and address will be answered in these columns.

marks from both pinion and ring gear will show.

We are inclined to believe, however, that what seems to be backlash is weakness of the spring in the end of the torque bar. If this spring is weak, it will permit the bar to chatter so violently that it will seem to be something else. If this is found to be weak, it may be fixed temporarily by using washers to take up some of the spring or by having the spring stretched and retempered. There is no more reason for backlash at 15 m.p.h. than at 20 or 25 m.p.h. It would appear as if the engine

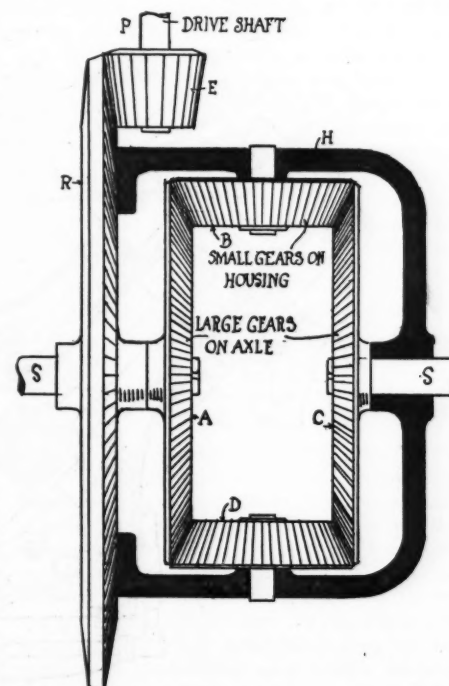


Fig. 3—Typical differential, showing method of operation

does not run smoothly at lower speeds owing to misadjustment of the carbureter.

2—The hub of the Houk wire wheel is keyed to the shaft just as if it were an ordinary wood wheel, and after removing the end nut you can use a wheel puller to remove the hub.

Efficiency of Transmission

Q—About what percentage of power is lost in a friction transmission such as is used on the Heider tractor, compared to a straight bevel-gear transmission? I refer merely to the power lost in turning the corner. Suppose the engine in each instance were mounted lengthwise of frame.—Ralph Seger, Sherwood, S. D.

Provided the load on the friction drive mechanism is not so great as to cause appreciable slipping, the efficiency is comparatively high. We know of no tests to determine the efficiency of such a drive experimentally. The loss in a friction drive is due chiefly to the fact that whereas the speed of all parts of the wheel surface is the same, the speed of the inner edge of the contact ring on the disk is necessarily less than that of the outer edge. The difference will be the greatest the nearer the wheels are moved to the axis of the disk. It has been calculated that with a width of contact of $1\frac{1}{2}$ in. and a mean radius of contact of 9 in., the theoretical efficiency is 96 per cent, whereas with a mean radius of contact of 3 in. the efficiency comes down to about 89 per cent. When there is appreciable slipping the efficiency, of course, would be lower. The efficiency figures given are substantially those obtained with bevel gears.

Engines

Installing New Engine

Q—Can a new Continental engine be put in a 1914 five-passenger Pullman car which is in good condition? What changes are necessary?

2—Could I successfully install it myself, having modern equipment in my shop?

3—Would I have to install a new clutch and universal joint?

4—Would it connect with the gearcase?—J. O. Selbert, Frankford Heights, Ill.

1—It is doubtful if this will pay, but it may be possible, although you do not state what model Pullman you have nor what model Continental engine you desire to use. Perhaps you can tell from a few measurements of the Continental 7W, which is a six-cylinder engine of $3\frac{1}{4}$ in. bore and $4\frac{1}{2}$ in. stroke, rated at 25.35 hp., S. A. E., or 38 brake horsepower at 2000 r.p.m. The front supporting arm measures 22 in., bolt centers, and the rear arm $27\frac{1}{2}$ in. The front supporting arm centers for drop, measure $3\frac{3}{4}$ in. and the rear, $2\frac{3}{4}$ in. The overall length of the engine, from the face of the fan to the rear of the flywheel housing, is 41 in.

2—Yes, if the measurements are near enough to come to a reasonably close fit and you have had experience in lining up engines.

3—While the engine can be furnished with or without flywheel housing it is doubtful if your present clutch would fit. Either a cone or disk clutch may be used with this engine and several concerns make the combination gearset and clutch that will fit because it is made under S. A. E. standard dimensions.

4—You would have to make fittings to reach the Pullman gearset if you did not

use a unit made for this particular engine, and this would require quite as much labor and expense as putting in a complete unit powerplant. You must remember that in all probability you will have to make changes in the hood, dash, possibly in the location of the radiating scheme, length and lineup of the propeller shaft and other matters. Usually it is an expensive job to fit a modern engine to an old frame. It may be suggested that it would be wise to make a sketch of the frame, showing the present dimensions, including distance between supporting arms, width of frame between these arms, distance between radiator and dash, distance from flywheel to gearset and from gearset to rear axle and then write the Continental Motors Corp., Detroit, for information as to what that concern can furnish to fit your chassis.

Calculating Horsepower

Q—I own a 100 point six KisselKar, which has a 3½ by 5-in. cylinder bore. How is the horsepower figured on this car, or any other car, by cylinder bore?

2—This car has 34-in. tires. What difference in horsepower would it make on 32-in. tires?

3—When starting this car, an enormous amount of heavy smoke comes out of the exhaust, even after pushing in choker button as far as practicable without stopping the car. Can this smoke be avoided, or is this caused by cold weather?—Joseph Schwickrath, Stratton, Col.

1—The N. A. C. C. rating on this engine would be 25.35 hp. This is determined by the following formula:

$$\frac{D^2 \times N}{2.5} = \text{HP.}$$

In which D is the bore in inches, N the number of cylinders and 2.5 a constant determined some years ago and generally recognized as being sufficiently correct for all practical purposes.

2—You would have the effect of gaining a little power, particularly in hard going or on hills, but the engine would be running faster at all times. Conditions would have to be taken into consideration to tell the exact difference in power; it would be so little as not to be worth mentioning, and it would not pay to make a change in tire sizes.

3—The carbureter is in need of adjustment, having too rich a mixture.

Knock in Buick Engine

Q—My C37 Buick which has been run 16,000 miles has a knock when the engine is running from 25 to 30 m.p.h. The knock can be heard in low, second or high speed when the engine reaches 25 m.p.h. It knocks when it is running idle, but does not knock on a pull. The engine is in good shape, bearings tight and does not carbon. There is very little carbon in the cylinders when it has been run a year. The plugs do not foul. New wristpins were put in but they were not the cause of the knock. I have been told this is a piston slap. If pistons are worn would the compression be poor?

2—Would not the cylinders and plugs get full of carbon? The compression is good when trying with crank.

3—Could one piston be causing the knock or should one put in all new pistons, if any?—Elmer Copeland, Libertyville, Iowa.

1—If the engine does not knock until a speed of 25 m.p.h. is reached and not on a pull, it is not a piston slap in all probability. It is more apt to be in the timing gears. It, however, would be possible for one piston to slap and not be noticed at low speeds of the engine. Wear in the pistons would not necessarily mean loss of compression, as the rings might be of good fit and would hold the compression.

2—If the rings are tight, the compression will be good, and if the compression is

good, it is not likely oil to any great amount will pass the rings.

3—If it is found that only a single piston is needed to be replaced, without regrinding the cylinders, it would be all right, but if it is found that one or more cylinders are out of round it means that all cylinders must be reground to an exact and similar size and new pistons fitted all through. It will be necessary to measure each cylinder carefully to determine if there is any difference in the sizes; likewise, measure the pistons, so that you will know each is of a size.

Use of Aluminum Pistons

Q—What are the advantages and disadvantages in using aluminum pistons in engines with a bore of about 3 in.?

2—Why is it that some makers bush the valve stems and some do not?

3—Is it not an advantage, and does it not add to the life of the engine to do so?—P. R. Gibson, St. Paul, Minn.

1—The advantage in the use of aluminum alloy pistons comes in the lighter weight of these important reciprocating parts, making the engine more snappy because of quicker action. The disadvantage is that because they must have more clearance than cast-iron pistons they are noisier until the engine becomes heated and the pistons have opportunity of expanding. Then when the engine is first started, and until the pistons have expanded, some of the unvaporized low-grade fuel now prevalent will pass the rings and pistons and find its way to the crankcase, there to dilute the lubricating oil and make it unsuitable for the purposes designed. This trouble will come more in cold weather than in warm. The oil in the crankcase will have to be drained and renewed more frequently with the aluminum alloy pistons than with cast-iron.

2—We are not aware that makers bush

the stems of the valves, for there would be no material advantage in this. The valve stem guides frequently are bushed on more expensive cars, for these then may be replaced when new valves are found to be necessary. This can be done in most engines by any good mechanic, and often it is resorted to when the valve guides or stems have become worn and yet are in good shape otherwise. In this case the valve guide is bored out and a bushing put in. Then the stems are ground a trifle smaller to true them up and the bushing is reamed out to fit the stems.

3—It is an advantage to the extent stated, but other than saving wear at one particular spot the engine is not affected.

Various Engine Questions

Q—Do race drivers' cars knock when going at high speed and when starting out?

2—Give instructions to remedy a leak in air pressure system installed on a 1916 Cadillac eight.

3—Illustrate location of check valves in this system. An inlet needle recently was installed on the motor air pump, the plunger on the hand pump, the washer that fits inside the cap on the gasoline tank, and the connections do not leak.

4—Why are the timing gears on a Buick 1918 so noisy? I have given them sufficient steam cylinder oil. The car has been driven about 6500 miles.

5—Illustrate Willys-Knight eight.—Herman Centlivre, Fort Wayne, Ind.

1—Possibly, but not likely. A racing car is supposed to be perfectly tight, clear of carbon and ignition properly set, and unless the driver gave too much spark advance and attempted to accelerate too quickly a knock would not be likely to occur.

2—First find the leak, which, it is obvious, cannot be discovered without tracing it down. It may be anywhere from the engine pump back to the tank. Not infrequently a tank will have a small leak and this is overlooked on the assumption that

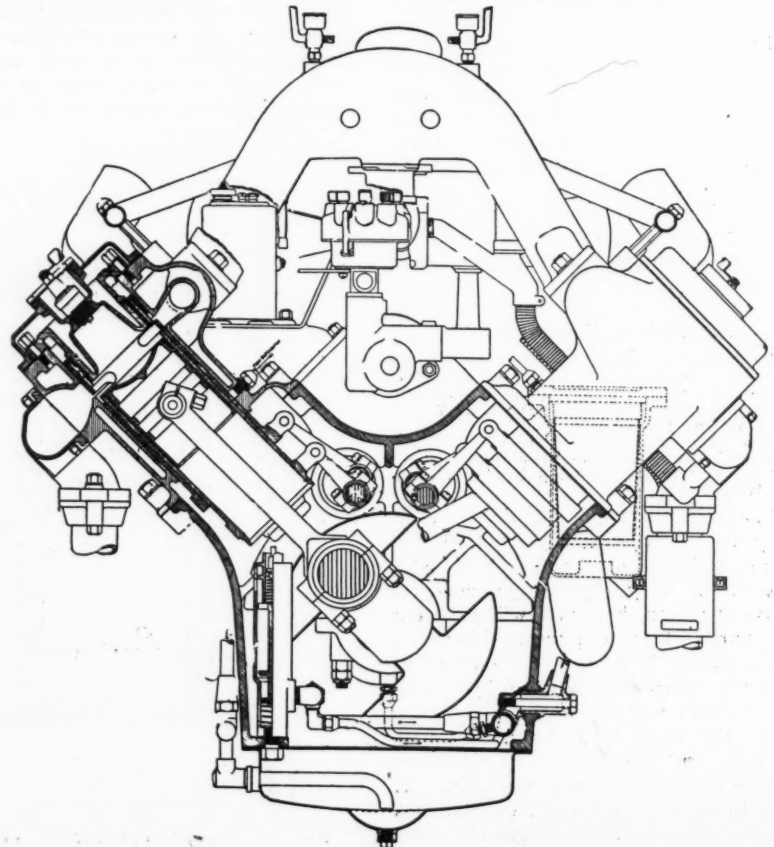


Fig. 4—Sectional view of eight-cylinder Willys-Knight engine

it is all right. By using the hand pump to work up as high a pressure as possible, the air leak may be discovered by taking a small sponge well saturated with water and running it along the pipe lines, holding it around the elbows and joints and at the corners of the tank. It may be necessary to have somebody keep working the hand pump while another works the sponge. Air bubbles will be discovered where there is a leak, and then the necessary remedy can be applied.

It may mean to have the tank soldered, to renew the ball checks, a nipple or a union as the case may be. First see if the leak is at the hand pump. This can be told by pumping up a few pounds' pressure and leaving the pump handle unlocked. If the air forces the handle back, there is a leak past the cup washer in the barrel of the pump and this will need renewing. If the handle goes back very slowly, the leak is not serious, for the engine pump will be sufficient to overcome the leak after starting.

3—This is not easily illustrated. At the bottom of the hand pump, just before the union, is a ball check that acts to prevent the air from backing up into the pump and, of course, there is a similar ball check at the engine pump to prevent the air from backing up into this pump. It is not likely a leak will occur here unless a small piece of dirt has become lodged between the ball and its seat. This is easily determined by uncoupling the unions and removing the balls.

4—There evidently has been wear some place, and wear usually comes from lack of lubrication or misalignment. The latter is not likely else the noise would have developed sooner. If the bearings in the outside cover of the timing gear case are worn this will tend to let the gears sag sufficiently to put them out of alignment enough to cause noise. The gears themselves are not likely to be worn. Look to the bearings mentioned or to the camshaft bearings.

5—A cross-section view of the Willys-Knight eight is shown in Fig. 4.

Trouble in Camshaft

Q—When the valves are adjusted so that the compression is good on all four cylinders the tappets for cylinders 2 and 3 are very noisy, and when this is remedied there is very little compression in 2 and 3. Can you suggest a remedy?

2—Give instructions for installing non-leaking rings. Are two better than one?—J. F. Hall, Chicago.

1—The trouble is with your camshaft. It is either running slightly off center between the bearings or else the lobe of the cam is worn on the face. If you take the camshaft out of the engine, have it centered on a lathe. This will tell whether or not it is true.

2—Instructions always accompany patented rings when they are purchased. Two rings hold the compression better than one, and also keep the oil out of the combustion chamber in a better manner than would one patented ring and one old type, one-piece, oblique slotted ring.

Wants Confidential Information

Q—Give diagram of most practical valve timing of Duesenberg, 300 cu. in. eight-valve engine. Give diagram of most practical valve timing of Duesenberg, sixteen-valve engine for racing purposes.—Ray McNay, Cincinnati, Ohio.

Information of a confidential nature re-

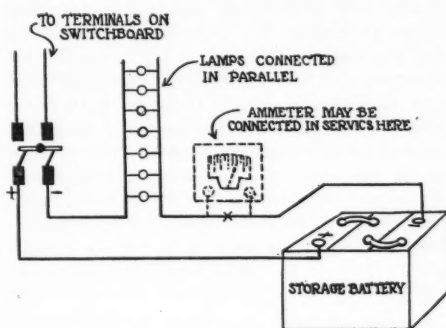


Fig. 5—Proper connections for charging battery by a light plant

garding racing motors is not available for publication. The Duesenberg Motor Corp., Elizabeth, N. J., will be very glad, however, to answer questions of this nature by personal letter.

Ford Engine Overheats

Q—I have a 1916 Ford and am bothered considerably by the water boiling. Honeycomb radiator with circulatory pumps have been used, but they do not help. Can the large head used on the Ford truck be fitted on my Ford, and will it eliminate my trouble due to the water boiling away?—Edgar Gifford, Chicago.

The engine in the Ford truck has a larger capacity for cooling water than the engine you are now using. The head used on the Ford truck engine cannot be used on your car because it is made for an engine with larger outside dimensions than yours.

Maxwell Engine Knocks

Q—My No. 25 1916 Maxwell touring car has a bad knock, or pound, when the engine idles with clutch fully disengaged. This has been diagnosed as the result of too much end play of the crankshaft. Main bearings and piston rod bearing are in proper adjustment. Is this harmful, and how can it be remedied?—R. F. Jackson, Minneapolis, Minn.

Crankshaft end play would not necessarily develop when the engine is running idle. It is more likely to be a piston slap or worn wristpins. This can be determined by putting the car to a hard pull, like ascending a hill or through some heavy going. If this is not at hand, set the emergency brake a little and then when driving at a normal speed open the throttle quickly. If the bearings or wristpin are loose, this will be shown immediately. A piston slap can be determined by trying the engine at various speeds. Any knock is harmful, because you do not know to what it may lead. Yet there are noises that have been known to exist for two or three years and have become no worse and no damage has accrued.

Aluminum Pistons in Hupmobile

Q—Which will be more satisfactory, aluminum or cast-iron pistons in installing a new set in a late 1916 model N Hupmobile?

2—What effect or harm, if any, would over-size tires have on this model? State correct size.—O. C. Gould, Fort Worth, Tex.

1—Pistons are not made from aluminum but from aluminum alloys, otherwise, they would not stand up. The alloy pistons will permit a snappier engine because of the lighter reciprocating parts, but they must be given more clearance to allow for the greater expansion of the metal. With the low grade of gasoline now on the market, it is hard to volatilize until the engine has become well heated and as a result, when it is cold, some of the gasoline will find its way past the pistons and to the crankcase and there will dilute the lubricating oil

to an extent, as it has happened, that it will not be effective and there will be danger of cutting the bearings and other parts. The cast-iron pistons will not permit quite such snappy action, but they may be fitted much closer and, therefore, there is less danger of the gasoline passing them and reaching the crankcase. For ordinary running, and where speed is not to be taken into consideration, the cast-iron pistons probably will last longer and give the ordinary driver less trouble.

2—Oversize tires will do no harm. They will increase the unsprung weight of the car a trifle, will add a little to the gear ratio and will tend to give the engine a little harder work, especially on a hill. You will gain in riding qualities a little and perhaps in tire mileage, but the 34 by 4-in. tires that are fitted to this car are sufficiently large unless it is to be used for hauling extra heavy loads of some sort.

Wear of V-Type Blocks

Q—Do the cylinder blocks on V-type engines wear more than the vertical cylinder blocks due to the angle at which the blocks are set and the weight of the reciprocating parts?—E. A. Hamilton, San Jose, Cal.

Pistons on all modern motor car engines, vertical and the V-type, are offset a slight amount from the center, that is, the wristpin in the piston is not exactly in the center of the piston. For example, the Buick is offset $\frac{1}{8}$ in. This prevents side slap of the piston on the change of stroke. In the V-type engines the piston and the resultant weight of the connecting rod and wristpin would tend to wear the cylinder blocks from the downward force caused by the weight of these parts. However, this offset acts as a counterbalancing force. Due to this, some engineers of good repute say that there is less wear on the V-type engine than on the vertical type.

The Electric System

Storage Battery Charging

Q—Give wiring diagram of Alamo electric lighting plant, 75-light size with a 1000-watt generator, to be used for charging motor car batteries. Show how to connect wires to plant and also explain the working as connected. I intend to use bulbs to cut down the current, as the plant is a 32-volt machine.—W. F. Werner, Dufur, Sask.

In charging a storage battery the voltage of the source of electrical energy must be greater than the voltage of the battery being charged in order that a current may be sent through the battery in the proper direction to bring about the correct chemical action which results in the plates being transformed into what are called charged plates. When a storage battery is charged the surface of the negative plates is covered with pure sponge lead, and the surface of the positive plates is covered with lead peroxide. During the process of discharge the material on the surface of both the negative and positive plates is converted into lead sulphate. This lead sulphate, of course, is changed back to pure sponge lead on the surface of the negative plate and to lead peroxide on the surface of the positive plate during the process of charging. The sulphuric acid combines with the lead and lead peroxide, during the process of discharge forming the lead sulphate, which weakens the acid, and its gravity is decreased. During charge the

lead sulphate is broken up and the acid is restored to the electrolyte, and as a result its gravity is increased.

The current that a given charging voltage will send through a storage battery will depend upon several things, and the following simple example will serve to illustrate what actually takes place. Assuming that you want to charge a storage battery having a voltage of 6.0 volts from a circuit having a voltage of 40 volts and that you want the charging current to be 6.0 amp., what resistance must be placed in circuit in order that this charging current will exist in the circuit?

When the battery to be charged is connected properly, that is, its positive terminal to the positive terminal of the charging source and likewise its negative terminal to the negative terminal of the charging source, the voltage of the battery will be opposing the voltage of the charging source. The difference between the voltage of the charging source and the voltage of the battery will represent what might be termed the effective voltage, or the voltage that is available for producing current. In the assumed case given the effective voltage is equal to

$$40 - 6.0 = 34.0 \text{ volts.}$$

Now this effective voltage is to produce a current of 6.0 amp. and the resistance of the circuit must be equal to the voltage divided by the current, or

$$\text{resistance} = 34.0 \div 6.0 = 5\frac{2}{3} \text{ ohms.}$$

This resistance of $5\frac{2}{3}$ ohms represents the total resistance of the circuit connected to the charging source which, of course, in-

cludes the resistance of the connecting leads, switches, the resistance offered by the battery itself, called its internal resistance, and any additional resistance that may be introduced into the circuit to regulate the current. Assuming, for convenience, that the resistance of the connecting leads, switches and internal resistance of the battery all amount to $\frac{2}{3}$ ohm, then an additional resistance equal to the difference between $5\frac{2}{3}$ and $\frac{2}{3}$ must be placed in the circuit in order that the charging current will be 6.0 amp.

As the battery continues to charge its voltage will increase in value and the effective voltage in the circuit will decrease, which will result in a decrease in the value of the charging current unless the resistance of the circuit is decreased. It is best to decrease the rate of charging as the charge approaches completion, and it may be necessary to increase the resistance of the circuit to bring about the desired decrease in the value of the current.

In the case just explained there was a difference between the battery voltage and the voltage of the charging source of 34 volts, used in producing a current in a resistance, and this energy was wasted as far as charging the battery is concerned. If four more three-cell batteries were placed in series with the first, making a total of five, then the total voltage of the batteries would be 30 volts and the effective voltage in the circuit would be equal to $40 - 30$, or 10 volts.

The resistance of the circuit must be equal to 10 divided by 6 or $1\frac{2}{3}$ ohms in or-

der that there be a charging current of 6 amp. In this case the same amount of electrical energy is being drawn from the charging source as in the first case, but a larger part of it is being used in charging batteries and a much smaller amount is wasted in heating the resistance in circuit. Hence, it is always advisable to connect as many batteries in series as you can, but their combined voltages must never exceed the voltage of the charging source, as otherwise the batteries would discharge rather than charge. As the batteries continue to charge their voltage increases and the voltage of the charging source should be equal to or preferably greater than the combined voltages of the batteries in series when the batteries are fully charged. It is advisable to connect batteries of the same charging rate in series if possible. If this cannot be done, the charging rate should be adjusted to correspond to the battery having the lowest rate. Those batteries having a higher rate will have to remain in circuit for a longer time in order that they may be fully charged.

The proper connections for charging batteries by the Almo electric light plant or any other plant are shown in Fig. 5.

One terminal of the battery is connected to one terminal of the switch, positive to positive or negative to negative, and the other terminal of the battery is connected to the opposite terminal of the switch with the proper number of lamps in circuit. The lamps are connected in parallel, and by proper number is meant the number which allows the desired charging current to pass

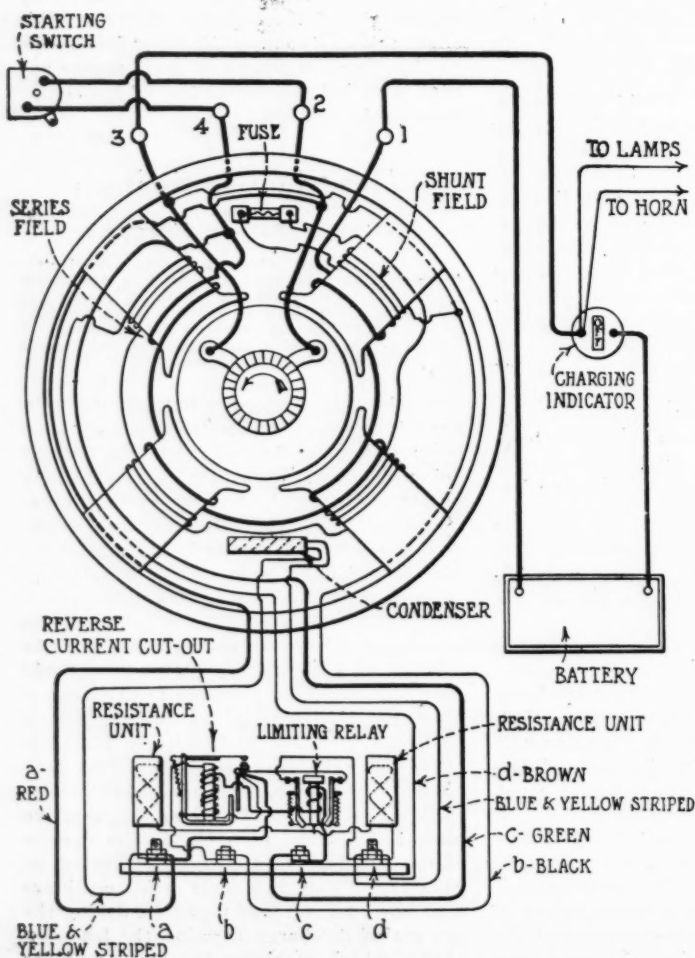


Fig. 6—Internal connections of North East model D system

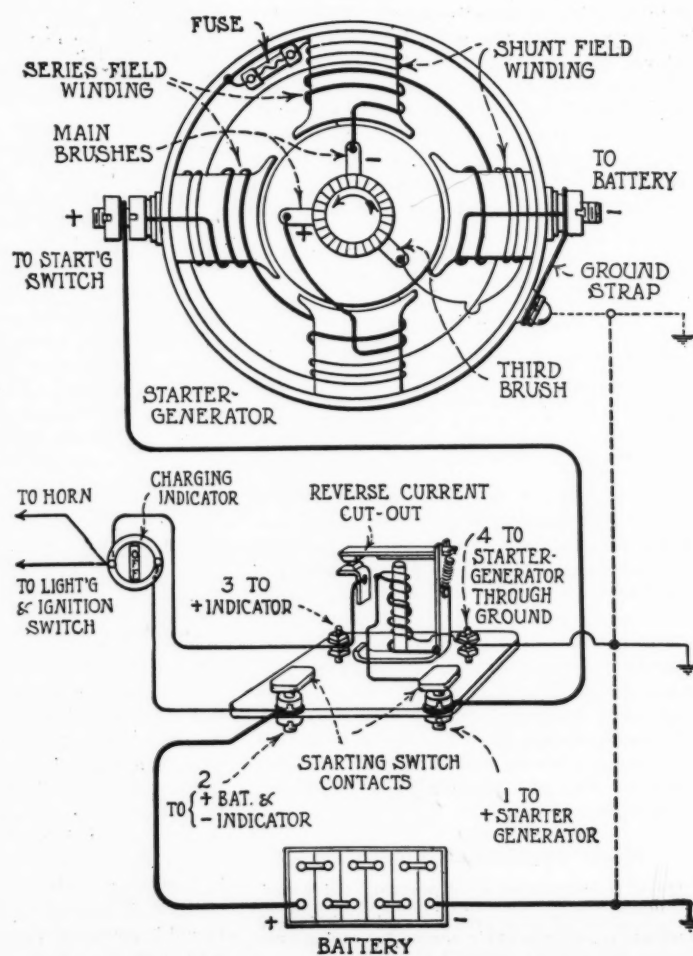


Fig. 7—Internal connections of North East model G system

through the battery. Increasing the number of lamps in parallel will lower the resistance and hence more current will pass through the battery. The number of lamps in circuit may be adjusted by screwing them in or out of their sockets until the electrical contact is made or broke.

The positive terminal of the charging circuit may be determined by placing the ends of the circuit in a glass of water, being careful to keep them some distance apart, and observing the bubbles of gas escaping from the terminals. The terminal from which the greater quantity of gas escapes is the negative terminal. If the switchboard on your charging plant is equipped with an ampere-hour meter, you can determine the number of ampere hours delivered to a battery by reading the meter at the beginning and end of the charge. If the ampere hour meter is equipped with a special contact switch for starting or stopping the engine, it will be necessary to discontinue the use of this device or the ampere-hour meter altogether.

In some cases the ampere-hour meter is equipped with a direct current indicating device, which will take the place of the ordinary ammeter, or an ammeter may be provided on the switchboard. If no ammeter of any kind is provided, one should be connected in circuit, as indicated in the figure by the dotted lines, so as to check on the value of the charging current.

Battery on Car Discharges

Q—We have a 1916 model North East Dodge Brothers starter that seems to work O. K., both as a starter and generator, but permits the battery to discharge through the starter when standing idle. As soon as the leads are connected with the battery, the current flows very rapidly until the engine is started. The current indicator then shows that the batteries are being charged. We sent this starter to a North East service station for repairs, but they failed to correct the trouble. We examined the cut-out, which seems to be O. K. The points are clean and are standing the proper distance apart. We would greatly appreciate any light you can give us that might help us to correct this trouble.—S. E. Sandersen, Town Creek, Ala.

From the description it is difficult to state whether this type of apparatus is the model D type 1264 or the model G type 3554 starter-generator, the former being installed on the early 1916 Dodge Brothers cars, while the latter was installed upon the later models of this car. Two wiring diagrams are shown in Figs. 6 and 7 of these two types of starter-generator. If the condition such as is described in your letter exists in the model D machine, the difficulty is due either to failure of the reverse current cut-out to operate properly or possibly the sticking of the points in the starting switch. Again, as the battery is grounded for lighting purposes an auxiliary ground occurring on the car wiring anywhere, of course, would discharge the battery.

If this condition is found in the model G type of generator, undoubtedly the difficulty is due to the failure of the reverse current cut-out to operate, this part being mounted in the 8100 starting switch on the footboard of the car.

Voltage Regulators

Q—What is voltage regulator? How is it made?—C. D. Meyer, Seattle, Wash.

We assume you refer by voltage regulators to devices used on Fords. They are simply a small coil of low-resistance wire around an iron core. The Ford generator

produces an alternating current, and when the speed of the engine increases the frequency of the current increases. This higher frequency current passing through this coil, which is in series with the lights, has its path impeded by the higher reactance of the coil at these higher frequencies.

The regulators on the ordinary starting and lighting equipments are called current regulators. They control the ampere charging rate by the vibrating of a small solenoid, which cuts in resistance in the field coil of the generator, when the voltage goes up and cuts it out when the voltage goes down.

Direction of Magneto Rotation

Q—How can a clockwise magneto be told from an anti-clockwise magneto?

2—Give the best way to time a motor car with a high-tension magneto.

3—With a high-tension magneto separate from a motor car and turning it by hand with no wires attached, how can I find out which post to connect wire to, running to cylinder No. 1, etc.—W. H. Ulrick, Miller, S. D.

1—The direction of rotation of the cam which operates the breaker should be along the arm toward the breaker points. The direction of rotation generally is marked at the driving end.

2—Set the spark lever at full retard, turn the engine over until No. 1 piston is at top dead center on the compression stroke, seeing that the valves are free; then the breaker should just begin to open. This is a universal rule and the advancing or retarding of the lever will take care of the rest, for the magneto is properly set to do its best work when it leaves the factory.

3—You should not turn a magneto by hand unless you have the base of the magneto on a "ground," particularly when there are no leads from the terminals. By taking off the distributor cap you easily will see the segments that lead to the spark plug wire terminals on the outside of the magneto.

You will have to know the firing order of your engine to know which lead should be carried to a particular cylinder. As a rule the terminals are marked, 1-2-3-4, for instance, on a four-cylinder magneto, but this does not mean that the leads are to run this way to the cylinders. If the firing order were 1-3-4-2, then your No. 1 lead would go to No. 1 cylinder, No. 2 lead to cylinder No. 3, No. 3 lead to cylinder No. 4 and No. 4 lead to cylinder No. 2. But, of

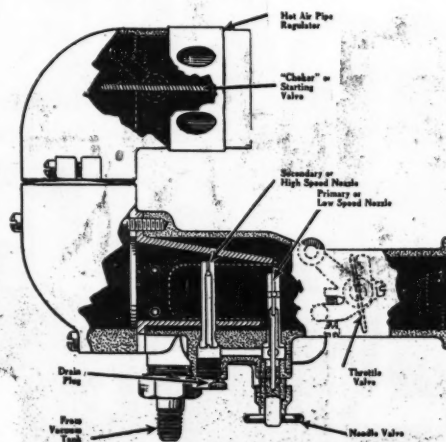


Fig. 8—Tillotson carburetor, showing automatic adjustment of air valve

course, the magneto would have to be timed on the camshaft gears so that this order would be brought about.

Carburetor

Tillotson Carburetor Section

Q—Give cross-section of Tillotson carburetor as installed on Willys-Knight.—Herman Centlivre, Fort Wayne, Ind.

1—The Tillotson carburetor is shown in Fig. 8.

Trouble with Carburetor

Q—My 1918 Buick six E45 is in perfect condition and has run about 3000 miles. Pickup, speed, pull and power is at highest efficiency and there is not the slightest miss. The carburetor has been adjusted. On speeding up and shutting off gasoline at throttle without slowing by use of brakes and leaving clutch in an irregular hissing or more of a swishing pop in the carburetor develops. This sound can be noted when car is running at about 15 m.p.h. or less. Experiments demonstrate that this noise can be brought out by maintaining this speed, cutting off gas and fully retarding spark.—J. A. Hutehins, Austin, Tex.

Your carburetor is not adjusted correctly, even though you are getting 15 m.p.g. of gasoline. The high-speed, or secondary, inlet should begin its operation when the limit of capacity of the low-speed inlet has been reached. The little screw on the bottom of the carburetor that controls the high-speed inlet should be closed a slight amount, and the T-head screw on the bottom that controls the low-speed opened an equal amount.

Rebuilding

Converting Olds Limited

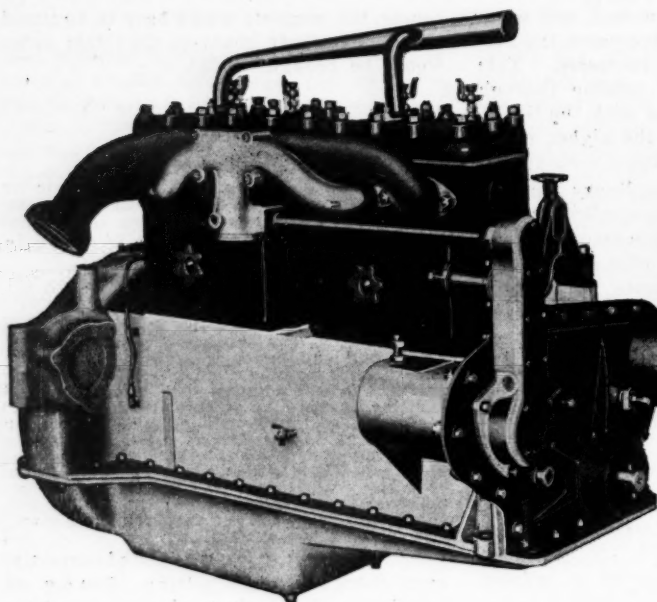
Q—Give suggestion for converting an Olds Limited into a roadster or seven-passenger car? I shall make the following changes: Instead of the 42-in. wheel, put on 35-in. wire wheels, new gear and pinion to make the speed right for those wheels, reduce the weight from 500 to 700 lb., 200 lb. on wheels and tires alone, 200 lb. on tool boxes, runningboards, etc. The present weight is 5000 lb. The bevel gear is built concave enough so that the new one could be made flat enough for the pinion to be 1 1/4 in. larger in diameter. The gear has forty-three teeth, the pinion has twelve, 7/8-in. pitch. This engine is strong, so that the gears could be stepped up 15 or 20 per cent and not overload it. Where can I buy a new bevel gear and pinion?—E. E. Thompson, Melvin, Ill.

If you use 35-in. wheels as you suggest, your new gear ratio to accommodate this will have to be about 1 to 2.99. If this is stepped up about 20 per cent the new gear ratio will be 1 to 2.39. This will mean eighteen teeth on the pinion if the gear still has forty-three teeth on it. Thirty-five-inch wheels will mean that the car will be lowered about 3 1/2 in. Be sure that the road clearance is sufficient when you put these smaller wheels on. The gears can be had from any of the gear companies advertising in MOTOR AGE. In ordering, give the intended use and full details.

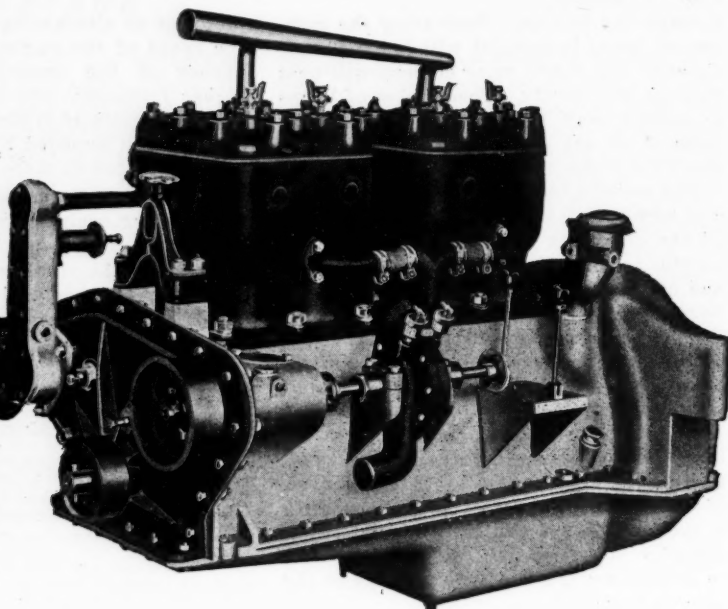
Installing Exhaust Horn

Q—Can you suggest a way to install an exhaust horn and cutout on an old Oldsmobile that has been cut down into a speedster, that does not require too much labor or expense?—J. F. Hall, Chicago.

Good cut-outs are on the market, costing but a small sum. The cut-out pedal is put in a position that will bring it directly over the exhaust pipe. Then with a hacksaw, the lower half of the exhaust pipe is cut out to a length of three or four inches, and the two halves of the cut-out are placed around the exhaust pipe at the place where the piece was cut out. The two halves are then bolted together around the pipe. The cut-out pedal is then connected to the arm of the cut-out on the exhaust pipe.



Left side of Continental B2 truck and tractor engine.



Right side of Continental B2 truck and tractor engine

War Truck Engine for Commercial Use

Continental Adopts Class B Government Model
with All Essential Qualities

THE Continental Motors Corp. has adopted the class B government engine to commercial usage and is now on the market with its model B2, which contains all the essential qualities of the class B truck engine, including the rigid inspection requirements and the same material and dimensions as the engine which was so highly successful in Government service. As this engine was designed with the idea of price secondary and the essential qualities of endurance and performance first, it is not by any means a low-priced engine but on the other hand, one which may be expected to give a good return in service in the tractor and heavy truck fields for which it is being manufactured.

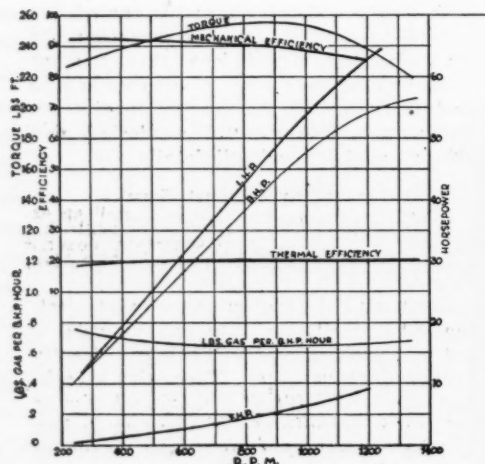
The four cylinders are cast in blocks of two with detachable heads and mounted on

an aluminum crankcase with a removable aluminum pan. The cylinders are L-head with inclosed valve mechanism and the engine is furnished in unit powerplant type construction adopted for three-point suspension.

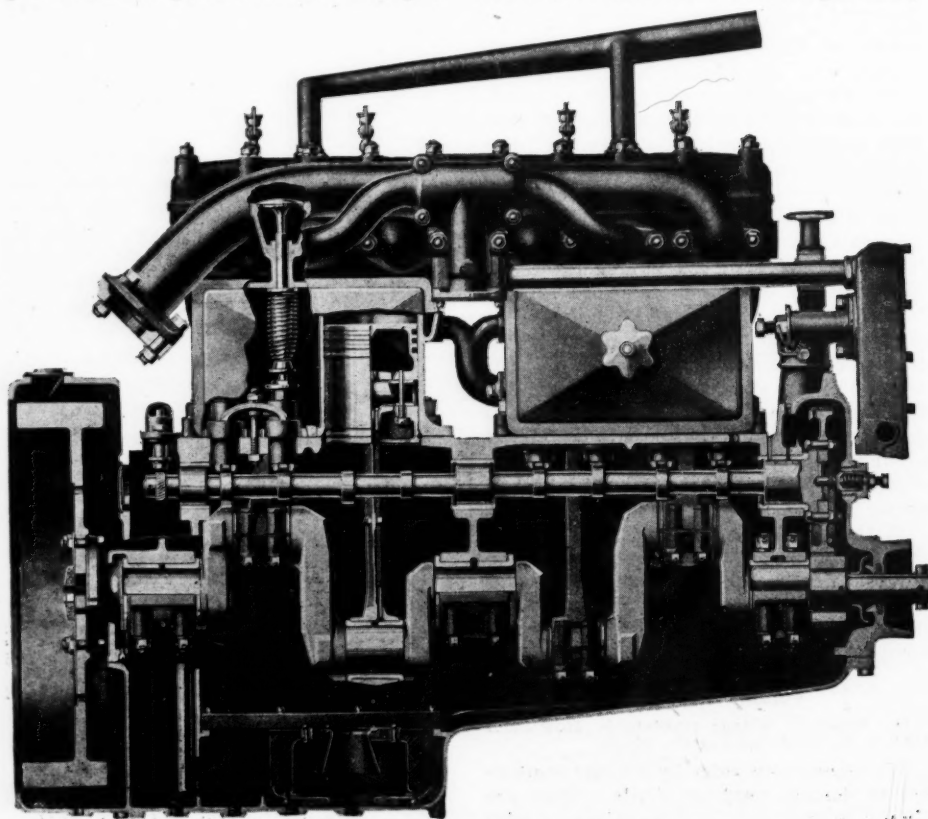
The performance, as taken from a block test, is shown on the accompanying chart upon which are plotted curves of torque,

mechanical efficiency, indicated horsepower, brake horsepower, thermal efficiency pounds of gas a brake horsepower hour and frictional horsepower. The engine is 4 1/4 in. by 6 in., or 120.7 by 152.4 mm.

The engine is strictly a heavy-duty type, having a piston displacement of 106 in. a cylinder and 424 for all four cylinders, with a clearance ratio of 25.3 per cent,



Performance curves of Continental B2 four-cylinder engine, which is the government class B truck engine adopted for commercial usage.



Partial section through Continental B2 truck and tractor engine

giving a normal compression of 60 lb. The engine fires 1-3-4-2. The valves are on the right side of the engine, the head diameter being $2\frac{3}{8}$ in. and the diameter of the opening $2\frac{1}{8}$ in. The seat angle is 45 deg. and the lift of both the inlet and exhaust is $\frac{1}{2}$ in. The manifolds are on the right side and assembled in unit to give an exhaust-heated intake. The engine is designed to take the standard No. 1 S. A. E. type of bolting flange and to take the standard type of multiple-disk clutch. The standard flywheel is $18\frac{3}{8}$ in. outside diameter and weighs 126 lb.

The cooling system is designed to be ample under the most adverse conditions of load and temperature, the water being circulated by a centrifugal pump on the left side of the crankcase between two cylinder blocks. The water inlet elbow is cast iron, being integral with the pump, with rubber connections to each of the cylinder block intake headers. The water outlet pipe is of brass tubing and is a separate unit, tapered throughout its length. The

water pump shaft rotates at crankshaft speed in a clockwise direction, looking at the front end of the engine. The fan is 20 in. in diameter and is driven by a flat belt, 2 in. in width, the drive pulley being $6\frac{1}{8}$ in. and the driven pulley, $3\frac{1}{4}$ in. in diameter.

Combination Oiling System

A complete pressure feed is used for oiling, the oil pump being gear-type, forcing oil to all bearings of the crankshaft, connecting-rods, camshaft and piston pins and to the gearcase. Splash is used for the cylinder walls.

The magneto is mounted on the left side and is driven off the water pump shaft. The carburetor fitting is for a vertical type, $1\frac{1}{2}$ in. standard S. A. E. flange. Special provision is made in the gearcase for a distributor to be driven from the pump drive-shaft. Spiral gear drive is used for the vertical shaft.

The governor is fitted and mounted on the gearcase cover and driven from the generator driveshaft. It controls the but-

terfly valve by a horizontal rod leading back to the intake passage. Provision also is made for a lighting generator to be attached to the right side of the engine, looking at the flywheel end. This is driven by an independent shaft. The starting motor also mounts on the right side of the engine and attaches to pads cast on the side of the crankcase and to the boss on the flywheel housing. The starting motor drives through the teeth on the flywheel, connection being established by Bendix shift.

Throughout the entire design is suitable for tractor use, in that there has been no sparing of material where rigidity is required. The crankshaft is $2\frac{1}{2}$ in. in diameter and is carried on three bearings. The camshaft is $1\frac{1}{4}$ in. in diameter and is carried on three bearings. The crankshaft bearings are respectively front, $2\frac{3}{8}$ by 3 in.; center, $2\frac{1}{2}$ by 4 in.; rear, $2\frac{1}{2}$ by 4 in. The camshaft bearings are respectively front, $2\frac{1}{4}$ by $2\frac{1}{2}$ in.; center, $2\frac{1}{8}$ by $1\frac{1}{4}$ in.; rear, 2 by $1\frac{3}{8}$ in.

Delco-Light, a Complete Light and Power Plant

DELCO-LIGHT comprises a complete electric light and powerplant, wherein unit construction has been closely adhered to. The generating unit takes in a single-cylinder air-cooled engine, generator and control board, while the current is stored in a set of sixteen glass jar batteries. Delco-Light is made by the Domestic Engineering Co., Dayton, Ohio, and is furnished in two sizes, $\frac{3}{4}$ and 3-kw. For average farm conditions the $\frac{3}{4}$ -kw. outfit furnishes ample light and power, while the larger size is especially well suited for country clubs, large estates, etc.

The smaller size plant is a 32-volt outfit and will handle about thirty-seven 20-watt lights, or up to a $\frac{1}{2}$ -hp. motor from the generator. With this outfit the storage battery is furnished in two sizes, 80 amp.-hr. capacity and 160 amp.-hr. capacity, depending on the needs of the purchaser.

The 3-kw. Delco-Light has four times the capacity of the smaller and is made both in 32- and 110-volt sizes. The former has a 160-amp.-hr. sixteen-cell battery and the latter either 80 or 160 amp.-hr. fifty-six cell battery. The 3-kw. job will handle something like 150 20-watt lights continuously, drawing current direct from the generator, and will operate motors up to 2 hp.

The $\frac{3}{4}$ - and 3-kw. plants sell respectively for \$465 and \$875.

The construction of the plant is such that the crankshaft of the engine forms also the armature shaft of the generator, that is, the generator is mounted on an extension of the crankshaft. Thus it is possible to carry the crankshaft on two bearings, Hyatt roller bearings being used on the flywheel end and New Departure ball on the generator. The engine is cranked by the generator, which operates as a motor when the starting switch is depressed. Cooling is accomplished by a current of air drawn by the sirocco fan in the flywheel down through the draft tube. The engine of the $\frac{3}{4}$ -kw. plant has a bore of $2\frac{1}{2}$ in. and stroke of 5 in. and develops $1\frac{1}{2}$ hp. Its approximate speed under load is 1000 r.p.m. The engine of the 3-kw. job is $3\frac{3}{4}$ by 6, develops 5 hp. and runs at about 1200 r.p.m. under load. A voltage-controlled throttle on this outfit automatically regulates the output.

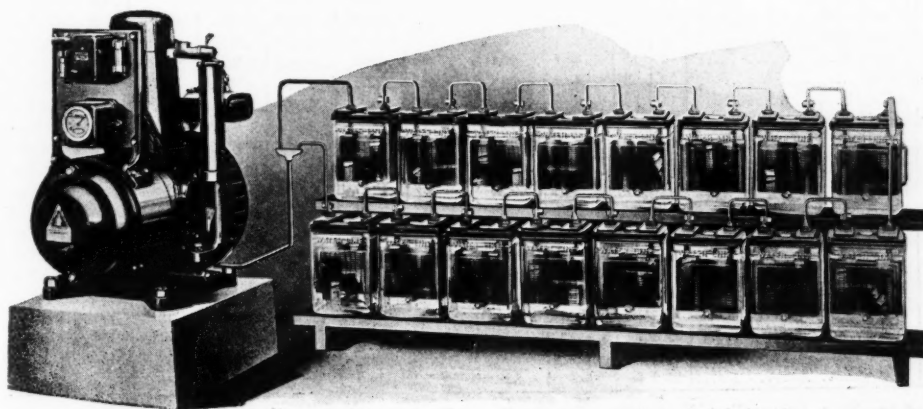
Lubrication is very simple, there being but one place to oil. A gear splash oiling system carries oil to all parts requiring lubrication. There are no grease cups. The aluminum piston carries three rings and has two oil grooves. Current for igni-

tion is taken from a coil, the wires from this to timer being very short. A counter-balanced crankshaft is used. Valves are in the head of the cylinder, operated by push-rods with easily reached adjustments. Kerosene is used for fuel. A simple mixing valve on top of the breather tube regulates the fuel supply.

The electrical units have been so placed that they are easy to get at when necessary. Thus, by removing the generator housing cover the brushes and commutator are exposed. The control board is placed on top of the generator housing and has mounted on it the starting and stopping switch and an ampere-hour meter. The light and power wires run from the top of the control board, two of them going to the batteries, while the remainder go to the light and power circuits.

The plates used in the storage batteries are very thick, and there is considerable sediment space below them. This insures long life, as it prevents foreign matter from building up and short-circuiting them. The glass jars are of ample capacity to take a large amount of electrolyte. This gives a low freezing point and helps to lengthen the life of the batteries. The separators, which are of wood, extend beyond the plates and make it impossible for sediment to build around the edges from plate to plate. The use of glass jars makes it possible at all times to see the exact height of electrolyte and insures the addition of water when necessary. One of the cells, called the pilot cell, has a white ball in a compartment on the side of the cell which acts as a hydrometer. When the ball is up the set of batteries is fully charged, and when the ball is down the cells are two-thirds charged, which is the signal that the engine should be started in order that the generator may bring the cells up to capacity.

The $\frac{3}{4}$ -kw. Delco-Light stands 30 in. high and requires a floor space 25 by $25\frac{1}{2}$ in. In the 3-kw. plant the dimensions are: height, 42 in., and floor space, 30 by 32 in.



Delco $\frac{3}{4}$ -kw. farm-lighting outfit

Motor Age Monthly Guide to Tractors

Line No.	Manufacturer	Tractor	Drawbar horsepower	Belt horsepower	No. plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of engine	Cylinders
1	Acme Harvesting Machine Co., Peoria, Ill.	Acme	12	25	3		2600	6000	\$1,800	2 Wh.	54	Beav.	4 Ver.
2	Acme	Acme	12	25	3		2600	6800	2,250	2 Cr.		Beav.	4 Ver.
3	Adams Co., Maryville, Ohio	Adams	9	13	1-2			5500	850	2 Wh.	36	Herc.	1 Hor.
4		Oil Pull	12	20	3	22 x 36	2150			2 Wh.	51	Own	2 Hor.
5	Advance-Rumely Co., Laporte, Ind.	Oil Pull	16	30	4	28 x 44	2850			2 Wh.	56	Own	2 Hor.
6		Oil Pull	20	40	5-6	32 x 52	3750			2 Wh.	64	Own	2 Hor.
7		Oil Pull	30	60	8-10	36 x 60	5900			2 Wh.	80	Own	2 Hor.
8	Allis-Chalmers Mfg. Co., Milwaukee, Wis.	Allis-Chalmers	10	18	2		1800	4800	1,250	2 Wh.	56	Own	2 Opp.
9	Andrews Tractor Co., Minneapolis, Minn.	Andrews	12	20			1900	5250	1,000	2 Wh.	48	Veer.	4 Opp.
10	Appleton Mfg. Co., Batavia, Ill.	Appleton	12	20		24	2200	4990		2 Wh.	54	Buda	4 Ver.
11		Aultman-Taylor	15	30			3300	7800		2 Wh.	70	Wauk.	4 Ver.
12	Aultman-Taylor Machinery Co., Mansfield, Ohio	Aultman-Taylor	18	36	4-6	30 x 46	4000	12500		2 Wh.	70	Own	4 Opp.
13		Aultman-Taylor	25	50	6-8	36 x 56	5500	18700		2 Wh.	78	Own	4 Opp.
14		Aultman-Taylor	30	60	8-12	42 x 64	8000	23000		2 Wh.	90	Own	4 Opp.
15		Multipedal	5	10			750	950		2Wor2C		Le Roi	4 Ver.
16		Multipedal	12	20			2000	3500		2 Cr.		Buff.	4 Ver.
17	F. C. Austin Co., Inc., Chicago, Ill.	Multipedal	15	30			2400	4500		2Wor2C		Asso.	4 Ver.
18		Multipedal	20	40	4		3200	10250		2 Cr.		Auto.	4 Ver.
19		Multipedal	25	50			4200	12500		2 Cr.		Buff.	4 Ver.
20		Multipedal	75	125			12500	24000		2 Cr.		Buff.	4 Ver.
21		Avery	5	10		Small		2150		2 Wh.	30	Own	4 Ver.
22		Avery	8	16	3	19 x 30		4900		2 Wh.	50	Own	2 Opp.
23	Avery Co., Peoria, Ill.	Avery	12	25	4	22 x 36		7500		2 Wh.	56	Own	2 Opp.
24		Avery	18	36	4	28 x 46		9250		2 Wh.	65	Own	4 Opp.
25		Avery	25	50	6	32 x 54		12500		2 Wh.	69	Own	4 Opp.
26		Avery	40	80	8-10	42 x 70		22000		2 Wh.	87 1/2	Own	4 Opp.
27	Bean Spray Pump Co., San Jose, Cal.	Track Pull	6	10	2		1125	3200	1,340	1 Cr.		Le Roi	4 Ver.
28	Beeman Garden Tractor Co., Minneapolis, Minn.	Beeman	11	4				285		2 Wh.	25	Own	4 Ver.
29	Beltrair Tractor Co., St. Paul, Minn.	Beltrair	12	20	2		2300	4500	1,600	1 Cr.		Wauk.	4 Ver.
30	C. L. Best Gas Tractor Co., San Leandro, Cal.	Best Tracklayer	20	40				11000	4,190	2 Cr.		Own	4 Ver.
31		Best Tracklayer	38	75				28000	5,750	2 Cr.		Own	4 Ver.
32	Blumberg Mfg. Co., San Antonio, Tex.	Blumberg	9	18				2450	850	2 Wh.	40	Own	4 Ver.
33		Blumberg	12	24				3400	1,250	2 Wh.	40	Own	4 Ver.
34	Boring Tractor Corp., Rockford, Ill.	Boring		20				3550	1,485	2 Wh.	54	Wauk.	4 Ver.
35	Brillion Iron Works, Brillion, Wis.	Brillion	12	22	3	26	3000	4900		2 Wh.	60	Field	4 Opp.
36	Buckeye Mfg. Co., Anderson, Ind.	Trundar	20	35	4		4000	9200		2 Cr.		Wauk.	4 Ver.
37	Buckeye Traction Ditcher Co., Findlay, Ohio	Buckeye 40	16	30				21000	5,500	2 Cr.		Auto.	4 Ver.
38		Buckeye 60	24	45				25000	6,500	2 Cr.		Auto.	4 Ver.
39		Creeping Grip	15	25			3000	7000	2,000	2 Cr.		Wauk.	4 Ver.
40	Bullock Tractor Co., Chicago, Ill.	Senior	35	50			6000	18000	4,500	2 Cr.		Wauk.	4 Ver.
41		Giant	50	75			7500	20000	5,000	2 Cr.		Wauk.	4 Ver.
42		Case	10	18	2-3	20 x 28	2080	3400	1,225	2 Wh.	42	Own	4 Ver.
43	J. I. Case T. M. Co., Racine, Wis.	Case	10	20	3	20 x 36	2330	5050	1,325	2 Wh.	52	Own	4 Ver.
44		Case	15	27	3-4	26 x 46	3000	5600	1,600	2 Wh.	52	Own	4 Ver.
45		Case	20	40	5-6	32 x 54	4400	14050	3,000	2 Wh.	66	Own	2 Opp.
46	Chase Motor Truck Co., Syracuse, N. Y.	Chase	9	18				4700	1,200	2 Wh.	48	Buda	4 Ver.
47	Cleveland Tractor Co., Cleveland, Ohio	Cleveland	12	20	2		1500	3200	1,585	2 Cr.		Weid.	4 Ver.
48	C. O. D. Tractor Co., Minneapolis, Minn.	C. O. D.	13	25	3		2500	6500	1,395	2 Wh.	70	Own	2 Hor.
49	Coleman Tractor Co., Kansas City, Mo.	Coleman	16	30			2000		1,750	2 Wh.	44	Clim.	4 Ver.
50	Columbus Tractor Co., Columbus, Ohio	Farmer Boy	10	20			1750	3600	1,350	1 Wh.	50	Wauk.	4 Ver.
51	Dart Truck & Tractor Corp., Waterloo, Iowa	Blue J.	15	30	3	24	3000	4500	1,750	1 Wh.	40	Buda	4 Ver.
52	Dauch Mfg. Co., Sandusky, Ohio	Sandusky J.	10	20	2-3	24	2000	4080	1,500	2 Wh.	48	Own	4 Ver.
53		Sandusky E.	15	35	4	32	3000	8000	2,500	2 Wh.	56	Own	4 Ver.
54	Dayton-Dick Co., Quincy, Ill.	Leader B.	12	18	2-3	24	2500	4800	1,000	2 Wh.	48	Own	2 Opp.
55		Leader C.	18	36	4-6	32	4000	6800	2,250	2 Cr.		Twin	4 Ver.
56	G. I. Dill Mfg. Co., Harrisburg, Ark.	Dill	20				6000	4400	2,480	2 Wh.	42	Cont.	4 Ver.
57		Capital 20	20					12000	3,000	2 Wh.	53	Own	2 Opp.
58	C. H. A. Dissinger & Bro. Co., Wrightsville, Pa.	Capital 30	30					14000	4,000	2 Wh.	60	Own	2 Opp.
59		Capital 45	45					16000	4,400	2 Wh.	66	Own	2 Opp.
60		Capital 75	75					24000	6,000	2 Wh.	84	Own	2 Opp.
61	Eagle Mfg. Co., Appleton, Wis.	Eagle F.	12	16	3	26	2400	5900	1,522	2 Wh.	48	Own	2 Hor.
62		Eagle	22	30	4	32	3700	7050	1,853	2 Wh.	52	Own	2 Hor.
63	Electric Wheel Co., Quincy, Ill.	Allwork	14	28	3	28	3000	5000	1,460	2 Wh.	48	Own	4 Ver.
64	Elgin Tractor Corp., Piqua, Ohio	Elgin B.	9	18			1600	2900	1,075	2 Wh.	42	Buda	4 Ver.
65		Elgin E.	10	20	3	20	2000	3300	1,385	2 Wh.	42	Ruten.	4 Ver.
66		E-B 12-20 AA	12	20	3	24	2500	4355		2 Wh.	54	Own	4 Ver.
67		E-B 9-16	9	16	2	18	1500	4280		2 Wh.	54	Own	4 Ver.
68	Emerson-Brantingham Co., Rockford, Ill.	E-B 12-20	12	20	3	24	2000	6500		2 Wh.	60	Own	4 Ver.
69		E-B 20-35	20	35	4-6	30	3000	9700		2 Wh.	72	Own	4 Ver.
70		E-B 40-65	40	65	8-10	44	10000	23600		2 Wh.	90	Own	4 Ver.
71	Evans Mfg. Co., Hudson, Ohio	Evans K.	20	35			3500	5500	2,000	2 Wh.	60	Buda	4 Ver.
72	Pageol Motors Co., Oakland, Cal.	Pageol	10	18	2		1000	3000	1,500	2 Wh.	48	Over.	4 Ver.
73	Farm Horse Traction Works, Hartford, S. D.	Farm Horse	16	34	3	28		4950	1,485	2 Wh.	48	Clim.	4 Ver.
74		Farquhar	15	25	3-4	27	2500	6000		2 Wh.	54	Buda	4 Ver.
75	A. B. Farquhar Co., Ltd., York, Pa.	Farquhar	18	35	4-5	30	3600	16000		2 Wh.	84	Own	4 Ver.
76		Farquhar	25	50	6-7	33	5000	19000		2 Wh.	84	Own	4 Ver.

Abbreviations: **Traction**—Wh., wheel; Cr., crawler. **Engine**—Beav., Beaver; Veer., Veerac; Herc., Hercules; Wauk., Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; horizontal; Opp., opposed. **Fuel**—G., gasoline; K., kerosene; D., distillate. **Carburetor**—Ray., Rayfield; King., Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Web., Holl., Holley. **Magneto**—A-K, Atwater Kent; Sum., Sumter; Eise., Eiseemann; Berl., Berling. **Clutch**—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; jaw clutch. **Final drive**—S. G., spur gear; G., gear; Ch., chain. **Drive**—Op., open; In., inclosed.

(These will appear next in the issue of Feb. 20.)

and Their Technical Specifications

Line No.	Bore and stroke	Normal R. P. M.	Fuel	Make and size of carburetor	Make of air cleaner	Make of magnet	Make of clutch	Make of gearset	Gearset type	Belt pulley diameter	Belt pulley R. P. M.	Belt speed F. P. M.	Speeds forward	Speed range, M. P. H.	Recommended plowing speed	Final drive	Drive	Furrow wheel	Line No.
1	4 1/2 x 6	850	G-K	1 1/2-King.	.....	K-W	Own	.....	Sl. G.	14	900	3300	2	2 1/4-3 1/4	2 1/4	S. G.	Op.	.....	1
2	4 1/2 x 6	850	G-K	1 1/2-King.	.....	K-W	Own	.....	Sl. G.	14	900	3300	2	2 1/4-3 1/4	2 1/4	S. G.	Op.	.....	2
3	.....	375	G-K	.....	.....	Web.	Own	.....	Ch.	14-18	950	.....	1	.....	2 1/4	Ch.	Op.	.....	3
4	6 x 8	500	K-D	2 1/4-Own	Donal.	Bosch	Own	.....	.....	19	560	2790	2	2.1-3.26	2.1	S. G.	In.	No	4
5	7 x 8 1/2	530	K-D	2 1/4-Own	Donal.	Bosch	Own	Own	Sl. G.	23	530	3190	2	2.1-3	2.1	S. G.	In.	No	5
6	8 x 10	450	K-D	3 1/4-Own	Donal.	Bosch	Own	Own	Sl. G.	26	450	3060	2	2-3.2	2	S. G.	In.	No	6
7	10 x 12	375	K-D	3 1/4-Own	.....	Bosch	Own	.....	.....	36	375	3540	1	1.9	1.9	S. G.	Op.	No	7
8	5 1/4 x 7	720	G-K	1 1/2-King.	Ben.	K-W	Own	Own	.....	14 1/2	720	2730	1	.....	2 1/4	S. G.	Op.	Yes	8
9	4 1/2 x 5	1000	G	1 1/4-Krice	.....	Bosch	Own	.....	Fr.	12	890	2500	3	.....	2 1/4	Ch.	Op.	Yes	9
10	4 1/4 x 5 1/4	1050	G-K	1 1/4-Scheb.	Ben.	Bosch	B. & B.	.....	Sl. G.	12	825	2600	2	2-3 1/4	.....	G.	Op.	Yes	10
11	4 1/4 x 6 1/4	900	G-K	.....	.....	Bosch	Own	Own	S. G.	20	450	2250	1	2.25	.....	S. G.	Op.	Yes	11
12	5 x 8	600	G-K	1 1/4-King.	.....	Bosch	Own	Own	S. G.	20	600	3100	2	2.13-2.93	2.93	S. G.	Op.	No	12
13	6 x 9	500	G-K	2 -King.	.....	Bosch	Own	Own	S. G.	24	503	3100	1	2.28	2.28	S. G.	Op.	No	13
14	7 x 9	500	G-K	2 1/2-King.	.....	Bosch	Own	Own	S. G.	24	500	3100	1	2.2	2.2	S. G.	Op.	No	14
15	2 1/2 x 4 1/2	1000	G-K	.....	Orem	K-W	Own	.....	.....	6	1440	2600	1	2 1/2	.....	.....	.....	Yes	15
16	4 x 5	1000	G-K	.....	Orem	K-W	Own	.....	.....	8	1300	2600	2	2 1/2-3 1/2	.....	.....	.....	No	16
17	1 1/4 x 6	900	G-K	.....	Orem	K-W	Own	.....	.....	9 1/2	965	2600	2	1 1/2-3 1/2	.....	.....	.....	No	17
18	5 x 7	800	G-K	1 1/2-Ben.	Orem	K-W	Own	Own	Sl. G.	20	500	2600	2	1 1/2-3	2	G.	Op.	No	18
19	6 x 7 1/2	750	G-K	.....	Orem	K-W	Own	.....	.....	20	500	2600	2	1 1/2-3	.....	.....	.....	No	19
20	7 1/2 x 9	550	G-K	.....	Orem	K-W	Own	.....	.....	20	500	2600	2	1 1/2-3 1/2	.....	.....	.....	No	20
21	3 x 4	1200	G-K	3/4-Zeph.	Ben.	A-K	Own	Own	Sl. Fr.	9	1000	2360	4	1-3	1 1/2	S. G.	Op.	No	21
22	5 1/2 x 6	600	G-K	1 1/4-King.	Ben.	K-W	Own	Own	Sl. G.	18	600	2830	2	1 1/2-3	1 1/2	S. G.	Op.	No	22
23	6 1/2 x 7	570	G-K	1 1/2-King.	Ben.	K-W	Own	Own	Sl. G.	19 1/2	570	2880	2	1 1/2-2 1/2	1 1/2	S. G.	Op.	No	23
24	5 1/2 x 6	650	G-K	1 1/2-King.	Ben.	K-W	Own	Own	Sl. G.	18	650	3000	2	2-3	2	S. G.	Op.	No	24
25	6 1/2 x 7	500	G-K	2 -King.	Ben.	K-W	Own	Own	Sl. G.	22	500	2880	2	2-3	2	S. G.	Op.	No	25
26	7 1/2 x 8	500	G-K	2 -King.	Ben.	K-W	Own	Own	Sl. G.	26	500	3400	2	1 1/2-2 1/2	2	S. G.	Op.	No	26
27	3 1/2 x 4 1/2	1200	D	1 -Mayer	Donal.	Bosch	Own	Own	S. G.	12	600	1900	2	1 1/2-2 1/2	1	G.	In.	.....	27
28	3 1/2 x 4 1/2	500	G	3/4-King.	Donal.	Heinze	Own	.....	.....	4 1/2	230	1500	1	3/4-3	3/4-2 1/2	.....	In.	.....	28
29	3 1/2 x 5 1/4	1000	G-D	1 -King.	Ben.	Dixie	Own	.....	Sl. G.	10	1000	2500	2	2 1/2-3 1/2	2 1/2	S. G.	Op.	Yes	29
30	6 1/4 x 6 1/4	600	D	1 1/2-Ens.	Ben.	Dixie	Own	Own	Sl. G.	.....	.....	.....	3	.....	2 1/2	G.	In	.....	30
31	7 1/4 x 9	435	D	2 -Ens.	Ben.	Dixie	Own	.....	Sl. G.	.....	.....	.....	3	.....	2 1/2	G.	In	.....	31
32	3 1/2 x 3 3/4	750	G	.....	Holl.	Dixie	.....	Foote	Sl. G.	10	600	1550	2	1-4	3	G.	In	Yes	32
33	3 3/8 x 5	750	G	1 1/4-Strom.	Holl.	Dixie	.....	Foote	Sl. G.	16	600	2480	2	1-4	3	G.	In	Yes	33
34	4 1/4 x 5 1/4	1000	G-K	1 1/4-	Ben.	King.	.....	.....	Sl. G.	10	435	1140	2	1-5	.....	Ch.	Op.	Yes	34
35	3 3/4 x 5	1000	K	1 1/4-King.	Own	Dixie	Bier.	Foote	Sl. G.	8	1000	2100	3	2-5	2	G.	Op.	No	35
36	4 1/4 x 6 1/4	950	G-K-D	1 1/2-Deppe	.....	Bosch	Own	Own	S. G.	10	950	2650	2	3.1-8	2 1/2	S. G.	In.	.....	36
37	6 1/2 x 8	500	G-K	1 1/2-Ben.	Ben.	K-W	Own	Own	G.	14	250	1000	4	3.1-8	.....	Ch.	Op.	.....	37
38	7 1/2 x 9	500	G-K	2 -Ben.	Ben.	K-W	Own	Own	G.	14	222	870	1	2 1/2	.....	Ch.	Op.	.....	38
39	4 1/4 x 6 1/4	900	G-K	1 1/4-Ben.	Ben.	Dixie	B. & B.	Own	Sl. G.	12	600	1875	3	1 1/2-3 1/2	2 1/4	.....	.....	No	39
40	5 1/2 x 7 1/2	850	G-K	.....	Ben.	Dixie	B. & B.	Own	Sl. G.	15	600	2250	3	1 1/2-3 1/2	.....	.....	.....	No	40
41	7 1/4 x 9 1/2	.....	G-K	.....	Ben.	Dixie	B. & B.	Own	Sl. G.	14	60	220	2	2 1/2-3 1/2	.....	.....	.....	No	41
42	3 1/2 x 5	1050	K	1 1/2-King.	Own	King.	Own	Own	Sl. G.	14 1/4	1050	3900	2	2 1/2-3 1/2	2 1/4	S. G.	In.	No	42
43	4 1/4 x 6	900	K	1 1/4-King.	Own	King.	Own	Own	Sl. G.	17	900	4000	1	2 1/4	2 1/4	S. G.	Op.	No	43
44	4 1/2 x 6	900	K	King.	Own	King.	Own	Own	Sl. G.	16	900	3762	2	2-3 1/2	2 1/4-3 1/2	S. G.	Op.	No	44
45	8 1/4 x 9	475	K	2 1/2-King	.....	K-W	Own	Own	Sl. G.	24	475	2980	2	2-3	2	S. G.	Op.	No	45
46	3 3/4 x 5 1/2	900	G	1 1/4-Holl.	.....	King.	Bier.	Own	Sl. G.	8	900	1885	2	1 1/2-2 1/2	1 1/2	G.	Op.	No	46
47	3 1/2 x 5 1/2	1200	G-K	1 1/2-King.	Own	Eise	Own	B. & S.	S. G.	8	1200	2500	2	1 1/2-2 1/2	3 1/2	G.	In.	No	47
48	6 1/2 x 7	550	K	1 1/4-King.	.....	K-W	Own	.....	S. G.	18	530	2500	3	.....	.....	S. G.	In.	Yes	48
49	5 x 6 1/2	800	G-K	1 1/4-Strom.	Ben.	Dixie	B. & B.	.....	.....	12	800	2100	2	1 1/4-4	3	Worm	In.	Yes	49
50	3 3/4 x 5 1/4	1000	K	1 1/4-King.	.....	K-W	B. & B.	.....	G.	12	1000	3140	2	2 1/4-3	2 1/2	S. G.	Op.	Yes	50
51	4 1/4 x 5 1/2	1050	G	1 1/4 Zen.	Ben.	Dixie	Fuller	Own	Sl. G.	12	750	2355	3	1 1/4-6	2 1/2	.....	In.	No	51
52	4 1/4 x 5 1/2	985	G-K	1 1/2-King.	Ben.	Dixie	Own	Own	Sl. G.	10	975	2577	3	2-5	2-3	S. G.	Op.	Yes	52
53	5 x 6 1/4	750	G-K	2 -King	Ben.	Dixie	Own	Own	Sl. G.	15	750	2945	2	2 1/2-3 1/2	3-4 1/2	S. G.	Op.	No	53
54	6 1/4 x 6	750	K	1 1/2-King.	Own	King.	Own	Own	Sl. G.	14	750	2750	2	1.8-3	1.8	G.	Op.	Yes	54
55	5 x 7 1/2	700	K	1 1/2-King.	Ben.	K-W	Own	Own	Sl. G.	14	700	2600	3	.....	1.8	Ch.	Op.	No	55
56	4 1/2 x 5 1/2	900	G	1 1/2-Scheb.	Donal.	Bosch	B. & B.	Cotta	G.	.....	.....	.....	.....	.....	.....	Ch.	Op.	No	56
57	8 1/2 x 12	300	.....	.....	.....	.....	.....	.....	.....	36	300	.....	.....	.....	.....	.....	.....	.....	57
58	9 x 14	300	.....	.....	.....	.....	.....	.....	.....	36	300	.....	.....	.....	.....	.....	.....	.....	58
59	10 1/2 x 15	250	.....	.....	.....	.....	.....	.....	.....	40	250	.....	.....	.....	.....	.....	.....	.....	59
60	12 x 16	250	.....	.....	.....	.....	.....	.....	.....	40	250	.....	.....	.....	.....	.....	.....	.....	60
61	7 x 8	425	K	1 1/2-Linga.	.....	Dixie	Own	Own	Sl. G.	20	450	2250	2	2-3	2	G.	In.	Yes	61
62	8 x 8	425	K	2 -Linga.	.....	Dixie	Own	Own	Sl. G.	24	450	2678	2	2-3	2	G.	In.	Yes	62
63	5 x 6	800	K	1 1/2-King.	Ben.	King.	Own	Own	Sl. G.	12	800	2514	2	1 1/2-2.4	2.4	S. G.	In.	Yes	63
64	3 3/4 x 5 1/2	1000	G	.....	Own	King.	Own	.....	Fr.	9	1000	2360	7	.....	3 1/4	Ch.	In.	Yes	64
65	4 1/2 x 5 1/2	1000	G-K	.....	Own	King.	Own	.....	Fr.	10	1000	2600	1	.....	3 1/2	Ch.	In.	Yes	65
66	4 1/2 x 5	900	K	.....	Ben.	K-W	Own	.....	Sl. G.	12	900	2800	2	1.81-2.33	.....	G.	In.	No	66
67	4 1/2 x 4 1/2	800	K	1 1/4-Ben.	Ben.	K-W	Own	.....	Sl. G.	12	800	2500	2	1.72-2.33	.....	G.	In.	No	67
68	4 1/2 x 5	850	K	1 1/2-Ben.	Ben.	K-W	Own	.....	Sl. G.	12	708	2225	3	1.6-3.4	.....	G.	In.	Yes	68
69	5 x 7	700	K	1 1/2-Ben.	Ben.	K-W	Own	.....	Sl. G.	16	597	2500	2	1.7-2.26	.....	G.	In.	No	69
70	7 1/2 x 9	500	K	2 1/2-Ben.	Ben.	K-W	Own	.....	Sl. G.	22	500	2880	1	2	2	G.	In.	No	70
71	4 1/2 x 6	950	.....	1 1/2-Ray.	.....	Bosch	B. & B.	Own	Sl. G.	24	425	2650	2	2 1/2-5	2 1/2	G.	In.	Yes	71
72	3 3/4 x 5	1100	G-D	Till.	Own	Berl.	Own	Own	G.	6	.....	.....	2	2 1/2-2 3/4	2 1/2	G.	Op.	Yes	72
73	5 x 6 1/2	800	K	1 1/2-King.	Ben.	Dixie	Bier.	Own	Sl. G.	14	800	.....	2	1-4	3	Ch.	In.	No	73
74	4 1/2 x 6	900	G-K	1 1/2-King.	Ben.	K-W	Own	Nutt.	Sl. G.	14	800	2000	2	1-4	.....	G.	In.	.....	74
75	6 x 8	550	G-K	2 -King.	.....	K-W	Own	.....	.....	32	275	2300	2	1-2.3	.....	G.	Op.	.....	75
76	7 x 8	550	G-K	2 -King.	.....	K-W	Own	.....	.....	32	275	2300	2	1-2.3	.....	G.	Op.	.....	76

Auto., Automatic; Weid., Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten., Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., vertical; Hor., horizontal; Zeph., Zephyr; Ens., Ensign; Strom., Stromberg; Till., Tillotson; Zen., Zenith; Car., Carter; Perr., Perrin-Ingram; Air Cleaner—Donal., Donaldson; Ben., Bennett; Spec., special. Gearset—B. & S., Brown & Sharpe; Nutt., Nuttall. Gearset type—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding.

Motor Age Monthly Guide to Tractors and

Line No.	Manufacturer	Tractor	Drawbar horsepower	Belt horsepower	No. plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of Engine	Cylinders
77	Henry Ford & Son, Inc., Dearborn, Mich.	Fordson	12	20	2		1800	2700		2 Wh.	42	Own	4 Ver.
78	Four Drive Tractor Co., Big Rapids, Mich.	Fitch	15	26	3	28	2200	5900	\$2,500	2 Wh.	42	Beav.	4 Ver.
79	Frick Co., Waynesboro, Pa.	Frick	12	25	3	27	3000	5800		2 Wh.	60	Erd	4 Ver.
80	Fulton Tractor Co., Anderson, Ind.	Fulton	10		2		2500	1,275		2 Wh.	56	Wauk.	4 Ver.
81	Gile Engine & Tractor Co., Ludington, Mich.	Gile Q.	18		4-5	36	3500	7000		2 Wh.	60	Own	4 Ver.
82	Gray Tractor Co., Minneapolis, Minn.	Gray	18	36	4	30	3750	6200	2,250	Drum	54	Wauk.	4 Ver.
83	Hart-Parr Co., Charles City, Iowa	New Hart-Parr	15	31	3	28	3000	5300	1,395	2 Wh.	52	Own	2 Hor.
84	Hession Tiller & Tractor Corp., Buffalo, N. Y.	Hession	13	25			3000	4200	1,675	2 Wh.	48	Erd	4 Ver.
85	Hollis Tractor Co., Pittsburgh, Pa.	Hollis	15	25	3		3000	2750	1,375	2 Wh.	30	Light	4 Ver.
86		Caterpillar	25	45			5000	13600		2 Cr.		Own	4 Ver.
87	Holt Mfg. Co., Peoria, Ill.	Caterpillar	40	75			9300	25000		2 Cr.		Own	4 Ver.
88		Caterpillar	70	120			15500	26500		2 Cr.		Own	6 Ver.
89	Huber Mfg. Co., Marion, Ohio	Huber Light Four	12	25	3	22	2300	5000	1,285	2 Wh.	60	Wauk.	4 Ver.
90	Illinois Tractor Co., Bloomington, Ill.	C.	18	36	4	32		5000	2,150	2 Wh.	54	Clim.	4 Ver.
91	Imperial Machine Co., Minneapolis, Minn.	Imperial	40	70			7500	20800	4,500	2 Wh.	96	Own	4 Opp.
92		Titan	10	20	3	24	1800	5700	1,225	2 Wh.	54	Own	2 Hor.
93	International Harvester Co., Chicago	Mogul	10	20	3	24	1800	5500	1,125	2 Wh.	54	Own	1 Hor.
94		International	15	30	4	28	2350	9000		2 Wh.	66	Own	4 Ver.
95	Interstate Tractor Co., Waterloo, Iowa	Plowman	13	30	3		2800	4400		2 Wh.	60	Buda	4 Ver.
96		Plowman	15	30	3		3200	4800		2 Wh.	60	Buda	4 Ver.
97	Joliet Oil Tractor Co., Joliet, Ill.	Bates Steel Mule	12	20	3	28		4300		2 Cr.		Erd	4 Ver.
98	Kansas City Hay Press Co., Kansas City, Mo.	Prairie Dog	9	18	2		1500	3000	1,150	1 Wh.	48	Wauk.	4 Ver.
99	Keck-Gonnerman Co., Mount Vernon, Ind.	Keck-Gonnerman	12	24	3	24		6500	1,500	2 Wh.	61	Own	2 Hor.
100		Flour City Jr.	14	24	3			6800		2 Wh.	60	Own	4 Ver.
101	Kinnard & Sons Mfg. Co., Minneapolis, Minn.	Flour City	20	35	4-6			10000		2 Wh.	72	Own	4 Ver.
102		Flour City	30	50	6-8			14000		2 Wh.	84	Own	4 Ver.
103		Flour City	40	70	8-10			21000		2 Wh.	96	Own	4 Ver.
104	La Crosse Tractor Co., La Crosse, Wis.	Happy Farmer, F	12	24	3	24	2000	3800	1,150	2 Wh.	56	Own	2 Hor.
105		G	12	24	3	24	2000	3800	1,250	2 Wh.	56	Own	2 Hor.
106	Lang Tractor Co., Minneapolis, Minn.	Lang	15	30			3000	4500	1,485	2 Wh.	50	Clim.	4 Ver.
107	Lauson, John, Mfg. Co., New Holstein, Wis.	Lauson	15	25	3-4	28		4000	1,895	2 Wh.	54	Beav.	4 Ver.
108	Leonard Tractor Co., Jackson, Mich.	Leonard	20	30	4	28	4000	5000	2,000	2 Wh.	50	Buda	4 Ver.
109	Lombard Auto Tractor Truck Corp., New York	Lombard					1000			2 Cr.		Own	6 Ver.
110	Liberty Tractor Co., Minneapolis, Minn.	Liberty	15	30				5775		4 Wh.	48	Clim	4 Ver.
111	Little Giant Co., Mankato, Minn.	Little Giant B	16	22	3-4	26		5200	1,650	2 Wh.	54	Own	4 Opp.
112		Little Giant A	26	35	5-6	32		8700	2,500	2 Wh.	66	Own	4 Opp.
113	Madison Motors Co., Anderson, Ind.	Bull	12	24	2-3	26	1900	5000	1,075	1 Wh.	72	Toro.	2 Opp.
114	Midwest Engine Co., Indianapolis, Ind.	Atlas	16	26			2800	5100	1,150	2 Wh.	66	Wauk.	4 Ver.
115		Twin City 12	12	20	3	20	2000	4000		4 Wh.	50	Own	4 Ver.
116		Twin City 16	16	30	4	24	3000	7800		2 Wh.	54	Own	4 Ver.
117	Minneapolis Steel & Machinery Co., Minneapolis, Minn.	Twin City 25	25	45	6	32	4700	16000		2 Wh.	76	Own	4 Ver.
118		Twin City 40	40	65	8-17	36	7500	23700		2 Wh.	84	Own	4 Ver.
119		Twin City 60	60	100	12-15		11250	28000		2 Wh.	84	Own	6 Ver.
120	Moline Plow Co., Moline, Ill.	Moline Universal D	9	18	2		2000	3300	1,500	2 Wh.	52	Own	4 Ver.
121		Lightfoot	6	10	1-2		1100	3200	1,250	2 Cr.		Kenn.	4 Ver.
122	Mosbach Tractor Co., Watertown, Wis.	Neverslip M	12	20	3	24	2200	6200	1,850	2 Cr.		Erd	4 Opp.
123		Neverslip N	18	30	4	28	3300	7400	2,250	2 Cr.		Doman	4 Ver.
124	National Tractor Co., Cedar Rapids, Iowa	National E	9	16	2	22	1800	3800	1,075	2 Wh.	46	Wauk.	4 Ver.
125		National F	16	22	3	26	2250	4200	1,375	2 Wh.	46	Wauk.	4 Ver.
126	Nilson Tractor Co., Minneapolis, Minn.	Nilson Junior	16	25	3-4	24	3000	5000	1,775	2 Wh.	50	Wauk.	4 Ver.
127		Nilson Senior	24	36	4-5	30	4000	6400	2,475	2 Wh.	52	Wauk.	4 Ver.
128	Ohio Mfg. Co., Upper Sandusky, Ohio	Whitney	9	18	2	20	1600	3000	1,050	2 Wh.	48	Gile	2 Opp.
129	Parrett Tractor Co., Chicago	Parrett F	12	25	3	24	2600	5200		2 Wh.	60	Buda	4 Ver.
130		Parrett H	12	25	3	24	2600	5350		2 Wh.	60	Buda	4 Ver.
131	Pioneer Tractor Co., Winona, Minn.	F	15	30	4	28		8500		2 Wh.	60	Own	4 Opp.
132		C	30	60	10	36		23500		2 Wh.	96	Own	4 Opp.
133	Port Huron Engine & Thresher Co., Port Huron, Mich.	Port Huron	12	25	3	22	2200	5700	1,500	2 Wh.	56	Erd	4 Ver.
134	Rock Island Plow Co., Rock Island, Ill.	Heider D	9	16	2	18	1500	4000	1,070	2 Wh.	54	Wauk.	4 Ver.
135		Heider C	12	20	3	24	2000	6000	1,395	2 Wh.	57	Wauk.	4 Ver.
136	Royer Ensilage Harvester Co., Wichita, Kan.	Royer	12	25			2200	4600	1,225	2 Wh.	54	Erd	4 Ver.
137		Junior	12	24	2	18	2000	6200		2 Wh.	53	Wauk.	4 Ver.
138	Russell & Co., The, Massillon, Ohio	Little Boss	15	30	3	24	3000	6900		2 Wh.	53	Wauk.	4 Ver.
139		Big Boss	20	40	4	30	4000	7600		2 Wh.	60	Model	4 Ver.
140		Giant	30	60	8	40	8000	24000		2 Wh.	84	Own	4 Ver.
141	Short Turn Tractor Co., Bemidji, Minn.	Short Turn	30		3		5000		1,550	2 Wh.	51	Erd	4 Ver.
142	Square Turn Tractor Co., Norfolk, Neb.	Square Turn	18	35			3200	7800	1,875	2 Wh.	61	Clim.	4 Ver.
143	Star Tractor Co., Findley, Ohio	Indiana	5	10			1000	1700	900	2 Wh.	50	Le Roi	4 Ver.
144	Stinson Tractor Co., Minneapolis, Minn.	Stinson	18	36	4	32	4750	6550		4 Wh.	60	Beav.	4 Ver.
145	Topp-Stewart Tractor Co., Clintonville, Wis.	B	20	35	4-6	30	4500	6500	2,750	4 Wh.	42	Wauk.	4 Ver.
146	Turner Mfg. Co., Port Washington, Wis.	Turner-Simplicity	12	20	2-3	24	2300	4000	1,395	2 Wh.	54	Wauk.	4 Ver.
147		Turner-Simplicity	14	25	3-4	28	2600	4400	1,675	2 Wh.	54	Buda	4 Ver.
148	U. S. Tractor Co., Minneapolis, Minn.	U. S. B	12	22			2000	3900	975	2 Wh.	60	Gile	2 Opp.
149		U. S. C	18	30			3000	4100	1,450	2 Wh.	60	Erd	4 Ver.
150	Wallis Tractor Co., Racine, Wis.	Cub Junior	15	25	2-3	24	2000	3250	1,600	2 Wh.	48	Own	4 Ver.
151	Waterloo Gasoline Engine Co., Waterloo, Iowa	Waterloo Boy	12	25	3	24	2000	6000		2 Wh.	52	Own	2 Hor.
152	Wichita Tractor Co., Wichita, Kan.	A	8	16	2-3		1500	3500	1,025	2 Wh.	60	Gile	2 Opp.
153	Wisconsin Farm Tractor Co., Sauk City, Wis.	E	16	32	3-4	28	3500	5240	2,250	2 Wh.	52	Clim.	4 Ver.
154	World Harvester Corp., New York	Auto Tiller	8	16			750	850	365	2 Wh.	36	Own	1 Hor.
155	Zelle Tractor Co., St. Louis, Mo.	Zelle	12	25	2-3	24	2000	3800	2,000	2 Wh.	54		4 Ver.

Abbreviations: Traction—Wh., wheel; Cr., crawler. Engine—Beav., Beaver; Veer., Veerac; Wauk., Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; Auto., Auto Opp., opposed. Fuel—G., gasoline; K., kerosene; D., distillate. Carburetor—Ray., Rayfield; King., Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Zeph., Zephyr; Ens., Atwater Kent; Sum., Sumter; Eise., Eismann; Berl., Berling. Clutch—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; Spec., special. Gearset—B. & spur gear; G., gear; Ch., chain; R. P., roller pinion. Drive—Op., open; In., inclosed.

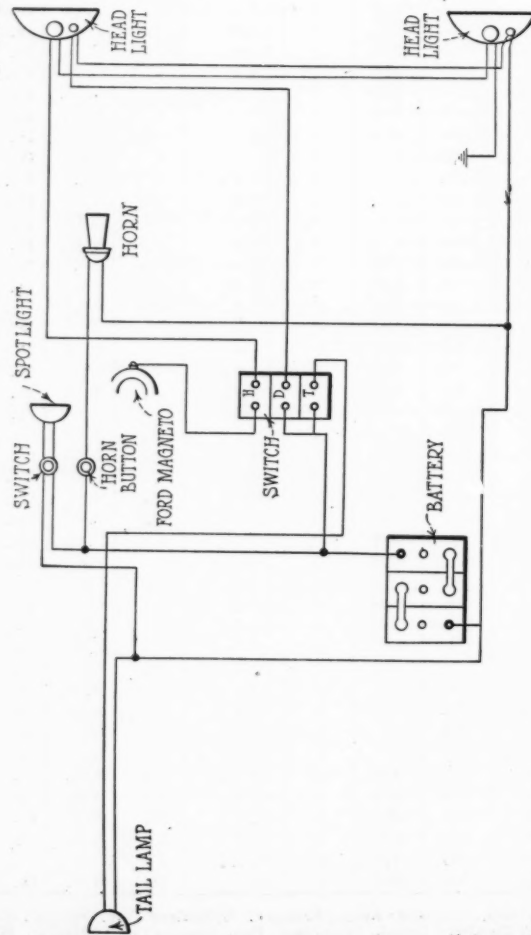
Their Technical Specifications—Concluded

Line No.	Bore and stroke	Normal R. P. M.	Fuel	Make and size of carburetor	Make of air cleaner	Make of magneto	Make of clutch	Make of gearset	Gearset type	Belt pulley diameter	Belt pulley R. P. M.	Belt speed F. P. M.	Speeds forward	Speed range, M. P. H.	Recommended plowing speed	Final drive	Drive	Furrow wheel	Line No.
77	4 x 5	1000	K	Holl.	Own	Own	Own	Own	S. G.	9	1000	2500	3	1-15	2½	Worm	In.	Yes	77
78	4½ x 6	1000	G-K	1¼-King.	Ben.	Dixie	Mun.	Mun.	Sel. G.	14	710	2600	3	1-4	2 ½	.....	In.	Yes	78
79	4 x 6	900	K	1¼-King.	Ben.	King.	Own	Nutt.	Sl. G.	13	900	3075	2	2.3-3.8	2.3	G.	Op.	Yes	79
80	3½ x 5¼	1150	G-K	1-King.	.....	King.	.....	.....	Fr.	.....	.....	.....	.....	1-15	2½-3	Ch.	Op.	Yes	80
81	4½ x 6½	875	G	1¼-Ben.	Own	Dixie	Own	Own	.....	16	500	2100	2	2½-3	.....	G.	In.	.....	81
82	4½ x 6½	850	G-K	1¼-Ben.	Ben.	K-W	Own	Own	Sl. G.	11	550	2600	2	2-2½	2½	Ch.	In.	No	82
83	6½ x 7	750	K	1¼-Scheb.	.....	K-W	Own	Own	Sl. G.	14	750	2750	2	1¾-3.8	3	G.	Op.	Yes	83
84	4 x 6	1000	G-K	King.	Ben.	Dixie	Bier.	.....	Sl. G.	13	.....	2600	2	2½-4	2-3	G.	Op.	Yes	84
85	3½ x 4½	1600	G-K	1¼-Zen.	Ben.	Dixie	Own	Own	Plan.	12	800	2400	2	1¾-7	2½	G.	In.	No	85
86	6 x 7	600	G-D	1¼-King.	Donal.	K-W	Own	Own	Sl. J. C.	14	625	2290	2	2½-3½	2½	G.	In.	No	86
87	7½ x 8	550	G-D	2-King.	Donal.	K-W	Own	Own	Sl. J. C.	16	467	2649	2	2½-3	2½	Ch.	In.	No	87
88	7½ x 8	600	G-D	2½-King	Donal.	K-W	Own	Own	Sl. J. C.	16	510	2649	2	2.3-3.27	2.3	Ch.	In.	No	88
89	4½ x 5¼	900	G-K	1¼-King.	Own	King.	Own	Own	S. G.	13	900	3063	2	2½-4	2 ½	G.	Op.	Yes	89
90	5 x 6½	400	K	1½-Strom.	Ben.	Dixie	Cotta	Foote	S. G.	14	600	2250	2	1½-3½	2½	.....	.....	No	90
91	7½ x 9	400	G-K	2-King.	Ben.	Dixie	Own	.....	S. G.	30	400	3200	2	1½-2½	2½-2½	G.	Op.	No	91
92	6½ x 8	500	K-D	Own	Own	K-W	Own	Own	S. G.	20	500	2000	2	1.8-2.5	2.5	Ch.	Op.	No	92
93	8½ x 12	400	K-D	Own	Own	K-W	Own	Own	S. G.	20	400	2060	2	1.8-2.5	1.8-2.5	Ch.	Op.	No	93
94	5½ x 8	575	K-D	Own	Own	K-W	Own	Own	S. G.	18	575	2800	2	1.8-2.4	2.4	Ch.	In.	No	94
95	4½ x 5¼	900	K	1¼-Ben.	Ben.	Dixie	Cotta	Foote	Sl. G.	12	590	1850	2	2-3½	2	G.	Op.	Yes	95
96	4½ x 6	925	K	1¼-Ben.	Ben.	Dixie	Cotta	Foote	Sl. G.	14	590	2600	2	2-3½	2-3	G.	Op.	Yes	96
97	4 x 6	900	G-K	1¼-Ben.	Ben.	Eise.	B. & B.	.....	Sl. G.	12	725	2300	2	2½-4	2½	G.	In.	Yes	97
98	3½ x 5¼	950	G-K	1-Ben.	Ben.	Dixie	Own	Own	S. G.	10	950	2500	2	2½-6	2½	G.	In.	Yes	98
99	6½ x 8	.....	K	1¼-Scheb.	Ben.	K-W	Own	Own	Sl. G.	16	650	2700	2	2-4½	2½	G.	In.	Yes	99
100	5 x 5	800	K	1¼-Scheb.	.....	A-K	Own	Own	.....	24	320	.....	2	2.2-3.25	.....	G.	.....	.....	100
101	5½ x 6	800	K	1¼-Scheb.	.....	A-K	Own	Own	.....	28	350	.....	1	2½	.....	G.	.....	.....	101
102	6½ x 7	600	K	2-Scheb.	.....	K-W	Own	Own	.....	32	275	.....	1	2½	.....	G.	.....	.....	102
103	7½ x 8	450	K	2-Scheb.	.....	A-K	Own	Own	.....	34	275	.....	1	2½	.....	G.	.....	.....	103
104	6 x 7	750	K	1¼-King.	Own	A-K	Own	Own	Sl. G.	11	750	2100	1	2½	2½	G.	Op.	Yes	104
105	6 x 7	750	K	1½ King	Ben.	A-K	Own	Own	Sl. G.	11	750	2100	1	2½	2½	G.	Op.	Yes	105
106	5 x 6½	650	G-K	1¼-Ray.	Ben.	Dixie	Own	Own	.....	14	800	2600	2	2½-5	.....	Ch.	In.	Yes	106
107	6½ x 6	950	G-K	1½-King.	Own	Dixie	Own	Nutt.	Sel. G.	18	475	2200	2	1½-3	2½	G.	In.	Yes	107
108	4½ x 6	1000	G-K	1¼-Zen.	Own	Dixie	Own	Own	Sel. G.	16	575	2400	2	1½-4	2.6	G.	In.	No	108
109	5½ x 7	.....	G	2½-Any	.....	Dixie	Spec.	Spec.	Sel. G.	.....	.....	.....	3	.....	2-4	Worm	In.	.....	109
110	5 x 6½	.....	.....	Strom.	.....	Dixie	.....	.....	.....	12	900	2600	2	2½-4½	.....	.....	.....	Yes	110
111	4½ x 5	900	K	1¼-King.	Own	K-W	Own	Own	Sl. G.	9	900	2100	3	1½-6	3	G.	In.	No	111
112	5½ x 6	750	K	1½-King.	Own	K-W	Own	Own	Sl. G.	13	750	2500	3	1½-6	3	G.	In.	No	112
113	5½ x 7	750	K	1½-King.	Donal.	King.	Own	Own	.....	12	750	2350	1	2½	2.4	G.	Op.	Yes	113
114	4½ x 5¼	1000	G-K	Own	Own	.....	.....	.....	.....	12	800	2512	2	2-3	.....	S. G.	Op.	.....	114
115	4½ x 6	1000	K	1¼-H-S	Ben.	K-W	Own	Own	Sl. G.	16	650	.....	2	2.2-2.9	.....	In.	Yes	.....	115
116	5 x 7½	650	G-K	1¼-King.	Ben.	K-W	Own	Own	Sl. G.	17	528	2400	2	2-2½	2-2½	S. G.	In.	No	116
117	6½ x 8	600	G-K	2-King.	.....	K-W	Own	Own	Sl. G.	20	600	3150	2	1.4-2	2	S. G.	Op.	No	117
118	7½ x 9	500	G-K	2½-King.	.....	K-W	Own	Own	.....	23	500	2900	1	2	2	S. G.	Op.	No	118
119	7½ x 9	500	G-K	3-King.	.....	K-W	Own	Own	.....	23	500	2900	1	2	2	S. G.	Op.	No	119
120	3½ x 5	1800	G	1¼-Holl.	Ben.	Remy	B. & B.	Own	Sl. G.	9	1200	2900	1	3½	3-3½	S. G.	In.	Yes	120
121	3½ x 4	900	G-K	1-King.	Ben.	K-W	Bier.	Foote	Sel. G.	.....	750	.....	1	2	2	Ch.	Op.	No	121
122	4 x 6	800	G-K	1¼-King.	Ben.	K-W	Bier.	Foote	Sel. G.	.....	500	.....	2	1½-2½	2	Ch.	Op.	No	122
123	4½ x 6	800	G-K	1½-King.	Ben.	K-W	Own	Own	Sel. G.	.....	565	.....	2	1½-2½	1½	Ch.	Op.	No	123
124	3½ x 5¼	1000	G-K	1-Ben.	Ben.	.....	Rock.	Own	Fr.	10	600	.....	6	2-3½	2-2½	S. G.	In.	Yes	124
125	4½ x 5¼	900	K	1¼-King.	Ben.	Eise.	Rock.	Own	Fr.	10	1000	.....	6	2-3½	2-2½	S. G.	In.	Yes	125
126	4½ x 5¼	900	G-K	1½-King.	Ben.	K-W	Own	Own	Sel. G.	20	400	1992	2	2½-5½	2½	Ch.	In.	Yes	126
127	4½ x 6½	800	G-K	1¼-King.	Ben.	K-W	Own	Own	Sel. G.	24	360	2160	2	2½-5½	2½	Ch.	In.	Yes	127
128	5½ x 6½	750	G	1¼-Ben.	.....	Dixie	Own	Own	Sel. G.	11	750	2100	3	1¾-4	2½	Ch.	Op.	No	128
129	4½ x 5½	1000	K	1¼-King.	Own	Eise.	Own	Own	Sl. G.	12	1000	3140	2	2½-4	.....	S. G.	Op.	Yes	129
130	4½ x 5½	1000	K	1¼-King.	Own	Eise.	Own	Own	Sl. G.	12	1000	3140	3	1¾-4	.....	S. G.	In.	Yes	130
131	5½ x 6	750	K	1¼-King.	Ben.	K-W	Own	Own	Sl. G.	14	750	2750	3	1¾-4	2½	Ch.	In.	Yes	131
132	7 x 8	600	K	2-King.	Ben.	K-W	Own	Own	Sl. G.	18	600	2700	3	1¾-4	2½	S. G.	In.	No	132
133	4 x 6	900	G-K	1¼-King.	Ben.	King.	.....	Fr.	.....	14	1065	3900	6	1½-4	2	S. G.	In.	Yes	133
134	4½ x 5½	800	G-K	1-King.	Ben.	Dixie	Own	.....	Fr.	12	600	2200	7	1-4	2½	S. G.	Op.	Yes	134
135	5½ x 6½	750	G-K	1½-King.	Ben.	Dixie	Own	.....	Fr.	14	700	2200	7	1-4	2½	S. G.	Op.	.....	135
136	4 x 6	900	K	1½-King.	.....	King.	.....	.....	.....	18	600	2828	2	2-3	2½	Ch.	Op.	.....	136
137	4½ x 5¼	1000	K	1¼-King.	Ben.	Bosch	Own	Cotta	Sl. G.	12½	915	3000	3	1½-3½	2½	S. G.	Op.	.....	137
138	4½ x 6¼	950	K	1¼-King.	Ben.	Dixie	Own	Cotta	Sl. G.	12½	810	2850	3	1½-3½	2½	S. G.	Op.	.....	138
139	5½ x 7	825	K	1½-King	Ben.	Dixie	Own	Own	Sl. G.	12½	840	2749	2	2.4-3½	2.4	S. G.	Op.	.....	139
140	8 x 10	525	K	2-King.	Ben.	Bosch	Own	Own	Sl. G.	24	525	3310	2	2-4½	2	S. G.	Op.	.....	140
141	4 x 6	900	K	.....	Ben.	Dixie	Own	Own	.....	.....	900	.....	2	2-3½	2½	Ch.	Op.	No	141
142	5 x 6½	850	G-K	1¼-Strom.	Ben.	Dixie	Own	Own	.....	12	850	1838	2	2-2½	2	S. G.	In.	Yes	142
143	3½ x 4½	950	G	1-Scheb.	Ben.	A-K	Own	Own	Sl. G.	6	1200	1880	4	2.1-3.6	2½	Ch.	Op.	Yes	143
144	4½ x 6	950	K	1¼-King.	Own	Dixie	Own	Own	.....	12½	1200	3900	1	.....	2-3½	S. G.	In.	Yes	144
145	4½ x 6½	900	G	King.	Ben.	Eise.	B. & B.	Own	.....	14	.....	2700	3	1¾-4	2½	G.	In.	.....	145
146	3½ x 5¼	1000	K	1¼-King.	Ben.	Dixie	Own	Foote	Sel. G.	14	600	2200	2	1½-3	1½-2½	R. P.	Op.	Yes	146
147	4½ x 5½	1000	K	1¼-King.	Ben.	Dixie	Own	Foote	Sel. G.	14	600	2030	2	1½-3	1½-2½	R. P.	Op.	Yes	147
148	5½ x 6½	850	G	.....	Ben.	.....	Own	Own	.....	12	900	.....	2	2½-2½	.....	G.	In.	Yes	148
149	4½ x 6	900	K	.....	Ben.	.....	Own	Own	.....	12½	1000	.....	2	2½-5	.....	G.	In.	Yes	149
150	4½ x 5¼	900	G-K	1¼-Ben.	Ben.	K-W	Own	Own	Sel. G.	18	430	2030	2	2½-3½	2½	S. G.	In.	Yes	150
151	6½ x 7	750	K	1¼-Scheb.	Own	Dixie	Own	Own	Sl. G.	14	750	2750	2	2½-3	2½	S. G.	Op.	Yes	151
152	5 x 6½	750	G	1¼-King.	Ben.	A-K	Bier.	Own	Sl. G.	12	750	2358	1	2½	2½	R. P.	In.	Yes	152
153	5 x 6½	800	K	1¼-Strom.	Ben.	Eise.	B. & B.	Foote	Sl. G.	16	575	2660	2	1¾-4	2 ½	S. G.	Op.	Yes	153
154	5 x 7	600	G-K	1¼-Per.	.....	A-K	Own	Own	.....	6	600	960	2	1½-2½	2	.....	.....	Yes	154
155	4½ x 5¼	900	K	1¼-Car.	.....	Bosch	Own	Own	Sel. G.	12	800	2500	4	1-5	2½	S. G.	In.	No	155

matic; Weid., Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten., Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., vertical; Hor., horizontal; Ensign; Strom., Stromberg; Till., Tillotson; Zen., Zenith; Car., Carter; Perr., Perrin-Ingram. Air Cleaner—Donal., Donaldson; Ben., Bennett; Holl., Holley. Magneto—A-K, S., Brown & Sharpe; Nutt., Nuttall. Gearset type—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding jaw clutch. Final drive—S. G.,

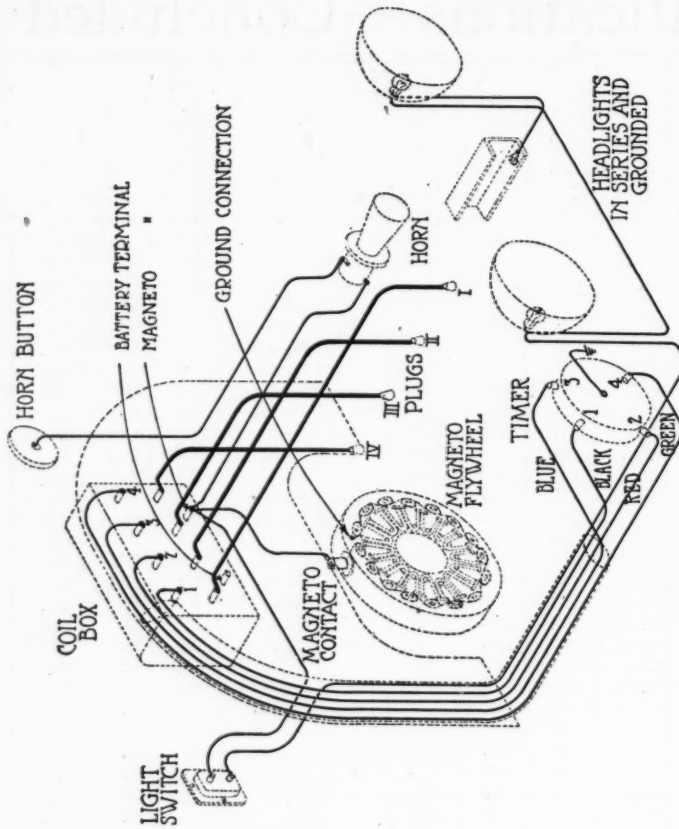
Motor Age Wiring Diagram Chart No. 13

Ford Models

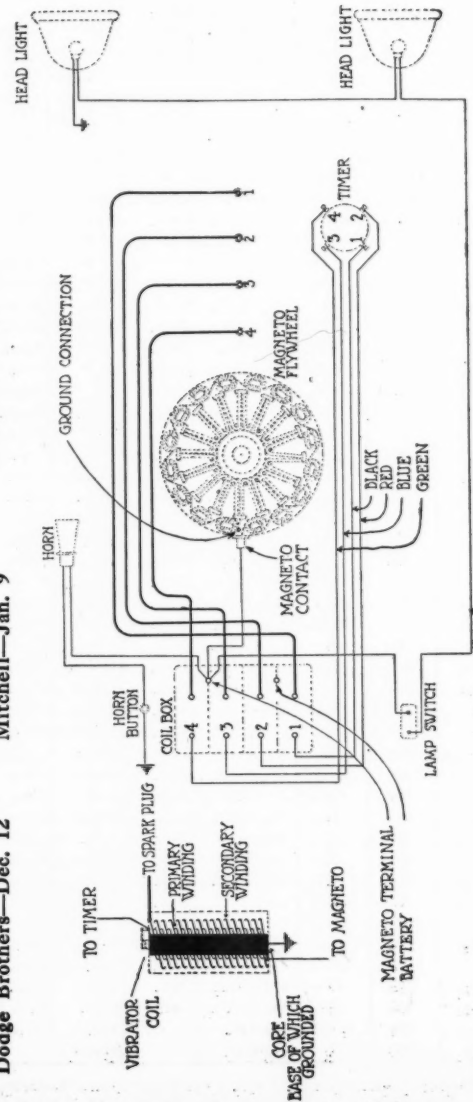
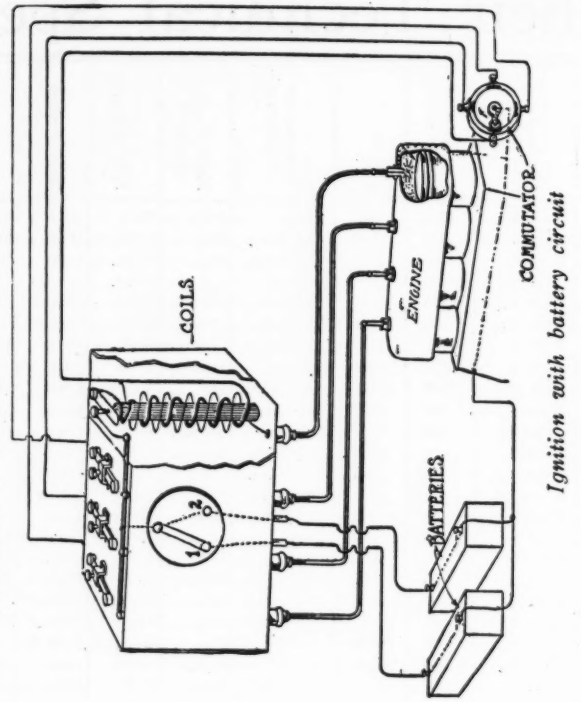


Wiring for Ford using storage battery for auxiliary bulbs, horn, spotlight and taillight

Alter—Nov. 14
 Buick—Nov. 21
 Cadillac—Dec. 19
 Chevrolet—Nov. 28
 Cole—Jan. 23
 Dodge Brothers—Dec. 12
 Hudson—Dec. 5
 Locomobile—Jan. 23
 Marmon—Dec. 9
 Maxwell—Dec. 16
 Mercer—Jan. 23
 Mitchell—Jan. 9
 Oakland—Jan. 2
 Oldsmobile—Jan. 23
 Overland—Nov. 7-14
 Scripps-Booth—Dec. 26
 Studebaker—Dec. 26



Perspective of wiring and component parts on Ford



FORD MODEL T

Standard equipment on a Ford

Among the Makers and Dealers

Short Trade Notes

MOTO-METER Opens Detroit Branch—The Moto-Meter Co., Inc., New York, has opened a branch office in Detroit with Jerry J. Tobias in charge.

Hornberger Goes to Globe—Henry L. Hornberger has been appointed general sales manager of the Globe Rubber Tire Mfg. Co., Trenton, N. J., with headquarters in New York.

Coombs to Wholesale Tire Dealer—C. R. Coombs, Chicago, for twelve years in the sales department of the Fisk Rubber Co., has been made sales manager for the Carlsen-Williams Co., Chicago, wholesale dealer in tires.

Apperson to Open Export Office—The Apperson Bros. Automobile Co., Kokomo, Ind., will open an export office March 1 in New York. George H. Strout, who has been in charge of the export department of the company at the factory for some years past, will be in charge.

Markle Out of Chicago Concern—L. Markle has sold his interest in the L. Markle Co. to Henry R. Levy, and the company has changed its name to the Studebaker Sales Co. Mr. Levy, the new president and principal owner, formerly was vice-president and general manager of the Markle organization.

Caruthers Is Denby District Manager—C. B. Caruthers has been appointed district manager for Indiana and Kentucky by the Denby Motor Truck Co., Detroit. He is one of the veterans of the industry, having been engineer of the Hupp-Yates company and experimental engineer for John Lansden. Of late years he has been in the selling end both as road man and associated with the Canadian branch.

Oil Stations Observe War Hours—Since the signing of the armistice there have been several announcements of motor car service shops and accessory and tire houses that were resuming night and Sunday service. But there has been a break in them. A. P. Robinson, manager of the Standard Oil filling stations, St. Louis, Mo., announced that all stations under his control will remain indefinitely on the wartime business hours. He takes this stand purely as a business measure, he says.

Sales Changes for Acme Truck—H. L. Browns, for several years with the Service Motor Car Co., has been appointed factory representative for the Acme Motor Truck Co. in Colorado, Wyoming, New Mexico and Utah. J. E. Bowles, who has been with the company for the last year as special representative in the middle western states, will be transferred to the Pacific coast, with headquarters at San Francisco, Cal. George P. Gould is to be factory representative in Massachusetts, Maine, New Hampshire and Vermont.

To Make Dann Automotive Products—The Automotive Productions Co., Detroit, has been incorporated for the manufacture and marketing of a complete line of automotive accessories. The new concern, capitalized at \$600,000, contemplates the extensive manufacture of Dann radiator filler caps, Dann automatic oil caps, gasoline tank filler caps and top holders and a starting primer unit for Fords. The company has absorbed the Consolidated Machine Co., which has been manufacturing screw machine products. The officers are: President and director of sales, J. N. Smoot;

vice-president and director of engineering, E. G. Dann, formerly with the Dann Products Co.; secretary-treasurer, W. C. Plummer.

Kelley with Gray & Davis Now—J. W. Kelley has joined the sales force of Gray & Davis, Inc., Boston, Mass., as sales engineer.

Siegfried Is with Auto Wheel—J. B. Siegfried, formerly general manager of the King Motor Car Co., Detroit, has been made sales manager and assistant general manager of the Auto Wheel Co., Lansing, Mich.

Service Motors Declare Dividend—The Service Motor Truck Co., Wabash, Ind., has declared a 6 per cent dividend, payable to stockholders of record Dec. 31, 1918, making a total of 15 per cent for the year just closed.

Warnock-Wirth Sales Department—The Warnock-Wirth Sales Co., Sioux City, Iowa, manufacturer of the Veltum pneumatic valve grinder, has located its department of sales in Chicago under the management of C. H. Scribner.

Templar Enlarges Plant—The Templar Motors Corp., Cleveland, Ohio, has erected a three-story, 500 by 72-ft. addition to its plant. It is a concrete structure with the outside walls practically all glass. This increased floor space of almost 2½ acres is now being equipped with machinery.

Continental Declares Dividend on Common—The Continental Motors Corp. has declared a dividend of 1½ percent on common stock. An official of the company states that there is no foundation to the rumors that the corporation has any intention of declaring extra dividends. Another report that the company was to build a plant in Canada also was denied.

Chevrolet Will Expand Toledo Plant—Chevrolet plans to expand its factory at Toledo, Ohio, to a \$4,000,000 or \$5,000,000 plant within two years, according to the recent announcement of T. W. Warner of the Toledo-Chevrolet Motor Co. Additional property of approximately 5 acres has been purchased for new buildings. The plant has been employing 1200 men, and it is expected that from 3000 to 4000 will be employed when the new additions are complete.

Holmes Foundry Is Organized—The Holmes Foundry Co., Port Huron, Mich., maker of steel castings and other foundry products for the General Motors Corp., has been incorporated with a capital stock of \$1,225,000, following the reorganization of the Romeo Foundry Co. The officers are: L. A. Holmes, president; L. G. Blunt, vice-president and general manager; C. C. Peck, secretary and treasurer; William F. Hooper, general superintendent.

Kalb and Watts Join Standard—Maj. Lewis P. Kalb, formerly in the engineering division of the Motor Transport Corps, has joined the engineering staff of the Standard Parts Co. as an assistant to J. G. Utz, director of engineering. Before entering the service, Major Kalb was chief engineer of the Kelly-Springfield Motor Truck Co., and previous to that was assistant truck engineer of Perce-Arrow. Capt. A. L. Watts, formerly in charge of the specification and record section of the engineering division of the Motor Transport Corps, has joined the engineering staff, where he assumes similar duties. Before entering the service in 1917, Captain Watts had been

in like work with Pierce-Arrow for many years.

Rumney Will Return to Detroit—Maj. Mason P. Rumney will be out of the service Feb. 14 and will return to the Detroit Steel Products Co. as assistant general manager. He has been located in Washington with the Ordnance Department.

Pearce Tire in New Plant—The Pearce Tire Rubber Co. is now in full operation in its new plant at Ashtabula, Ohio. Officials say that within sixty days production will exceed 100 tires daily. This will be increased gradually until the full capacity of the factory of 500 a day is reached.

Middleton Back from Army—Roy T. Middleton, who in May, 1917, resigned as Detroit manager for the Steel Products Co. to enter the Air Service, reached Detroit last week as Capt. Roy T. Middleton. He rose from private to captain in eighteen months. Now out of the Army, he is on his way to Cleveland, Ohio, to become general representative for the Standard Steel Casting Co., maker of standard steel wheels for motor trucks.

Jessup to Assist Remy President—Charles M. Jessup, for the last four years director of the commercial interests of the motor equipment division of the Remy Electric Co., Detroit, has been appointed assistant to O. F. Conklin, president of the company. In addition to his new duties as assistant to the president, Mr. Jessup will have full supervision of sales of the motor equipment division. He will be located at the Detroit office.

Vogler Joins Service Truck—H. J. Vogler is district sales manager for the Service Motor Truck Co., assigned to district No. 2, which includes Maryland, Virginia, District of Columbia and the Carolinas, and took up his work there on Jan. 1. Before entering the Army Captain Vogler was wholesale manager for Willys-Overland and also had charge of the dealer organization in the East. Prior to his connection with Willys-Overland he was eastern superintendent for Maxwell.

New Truck-Tractor Designed—W. C. Blackmon of Flint, Mich., has made application for a patent on a new truck-tractor which, he says, not only drives every wheel but should one wheel strike a slippery spot and attempt to spin, differentials instantly lock and every wheel must turn. He states that in less than 5 min. the tractor can be turned into a truck in which all the expense of punctures and blow-outs will be eliminated, as the quad drive and differential lock make the solid tire work as well as the pneumatic.

Tri-City Dealer Association Elects—At the annual meeting of the Tri-City Auto Trade Association, composed of dealers in motor cars, trucks and tractors of Rock Island and Moline, Ill., and Davenport, Iowa, new officers were elected for the ensuing year as follows: President, C. E. Alford, Davenport; first vice-president, A. J. Ostlund, Moline; second vice-president, T. G. Don, Rock Island; secretary, Thomas Coughlin, Davenport; treasurer, A. J. Sala, Rock Island. Members pledged themselves to re-employ all those who had gone to war. It was voted to stage the annual show of cars, trucks and tractors and a committee was appointed to select the date and location.

From the Four Winds

Glimpses at the World of Motordom

PLENTY of Road Boards for County—If Chippewa County, Michigan, does not get the snowdrifts plowed from its roads it will not be because of a deficit in road boards. Three groups of men, all claiming the office as road commissioner, have taken possession of the road office in the courthouse and there they vow they will stick until they are put out

by court order. All seven of them have filed bonds and oaths of office with the county clerk. Supervisors in October appointed Frank Warner, Richard Larke and Andrew Short as road commissioners under the 1917 amended law. David Knox, Harry Beamish and Andrew Reinhard challenged the constitutionality of this amended law and had their

names voted on at November election and were elected on slips. The new board was to replace Donald Smith, who had been elected under the one-man-board law. Smith refused to relinquish his office to either of the boards, claiming that neither have had their bonds approved by the supervisors, and there is grave doubt as to which the would-be boards has the right to the office.

Coming Motor Events

SHOWS

Milwaukee, Wis.	Milwaukee Automobile Dealers, Inc.	Jan. 24-30
Fargo, N. D.	Implement Dealers' Association, tractors.	Jan. 22-24
Chicago	Automobile Trade Association, cars.	Jan. 25-Feb. 1
Toledo, Ohio	Automobile Trade Association, trucks.	Jan. 27-Feb. 1
Chicago	Automobile Trade Association, cars.	Feb. 3-6
New York	Automobile Dealers' Association, cars.	Feb. 1-8
Fargo, N. D.	Automobile Dealers' Association, cars.	Feb. 4-7
San Francisco	Motor Car Dealers Association.	Feb. 6-15
New York	Automobile Dealers' Association, trucks.	Feb. 10-15
Albany, N. Y.	Automobile Dealers' Association.	Feb. 15-22
Cleveland, Ohio	Automobile Trades Association.	Feb. 15-22
Rochester, N. Y.	Automobile Dealers' Association.	Feb. 15-22
Louisville, Ky.	Auto Dealers' Association, automotive.	Feb. 17-22
Newark, N. J.	N. J. Auto Exhibition Co.	Feb. 15-22
Minneapolis, Minn.	Northwestern Automotive Exposition.	Feb. 15-22
Des Moines, Iowa	Automobile Dealers' Association, automotive.	Feb. 17-22
Grand Rapids, Mich.	Automobile Business Association.	Feb. 17-22
South Bethlehem, Pa.	Lehigh Valley Auto Shows Co., cars.	Feb. 17-24
St. Louis, Mo.	Manufacturers' and Dealers' Association.	Feb. 17-22
Wichita, Kan.	Wichita Tractor and Thresher Club.	Feb. 18-22
Hartford, Conn.	Automobile Dealers' Association.	Feb. 22-March 1
South Bethlehem, Pa.	Lehigh Valley Auto Shows Co., trucks.	Feb. 24-27
Springfield, Mass.	Cars and trucks.	Feb. 24-March 1
Kansas City, Mo.	Motor Dealers' Association, cars.	Feb. 24-March 1
Kansas City, Mo.	Kansas City Tractor Club, tractors.	Feb. 24-March 1
Portland, Ore.	Dealers' Motor Car Association.	Feb. 24-March 1
Cedar Rapids, Iowa		Feb. 24-March 1
Burlington, Iowa		Feb. 24-March 1
Duluth, Minn.		Feb. 25-March 1
Madison, Wis.	Association of Commerce.	Feb. 26-March 1
Detroit	Automobile Dealers' Association.	March 1-8
Columbus, Ohio	Automobile Show Co.	March 3-8
Buffalo, N. Y.	Automobile Dealers' Association.	March 3-8
Quincy, Ill.	Automobile Trade Association.	March 5-8
Omaha, Neb.	Automobile Trade Association, automotive.	March 10-15
Syracuse, N. Y.	Automobile Dealers' Association.	March 10-15
St. Joseph, Mo.	Dealers' Association.	March 12-15
Peoria, Ill.		March 12-15
Boston, Mass.	Automobile Dealers' Association, cars.	March 15-22
Harrisburg, Pa.	Motor Dealers' Association.	March 15-22
Peoria, Ill.		March 17-18
Brooklyn, N. Y.	Motor Vehicle Dealers' Association, cars.	March 22-29
Trenton, N. J.	Auto Trade Association.	March 22-29
Pittsburgh, Pa.	Automobile Dealers' Association.	March 22-29
Brooklyn, N. Y.	Motor Vehicle Dealers' Association, trucks.	April 1-5

SHOW DATES INDEFINITE

Bridgeport, Conn.	City Battalion.	Not Decided
Indianapolis, Ind.	Automobile Trade Association.	Not Decided
Little Rock, Ark.	Automobile Dealers' Association.	Not Decided
Philadelphia, Pa.	Automobile Trade Association.	March
Philadelphia, Pa.	Motor Truck Association.	March
Utica, N. Y.	Motor Dealers' Association.	March

MEETINGS

New York	Society of Automotive Engineers.	Feb. 4-6
New York	N. A. C. C., passenger cars.	Feb. 5
New York	N. A. C. C., trucks.	Feb. 11
New York	American Road Builders' Association.	Feb. 25-28
Hot Springs, Va.	Automotive Equipment Association.	June 2-6

RACES

Indianapolis, Ind.	500-Mile Sweepstakes.	May 31
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Owners' Consent for Public Garages—Local courts have held to be valid a city ordinance passed some time ago in Wilmington, Del., prohibiting the erection of public garages within 40 ft. of other buildings unless the owners of the latter gave consent. A case of this kind has just been decided, work having been started under a permit issued by the building inspector, which, after a protest had been made, the city council ordered revoked. There is hint of an action for damages against the city.

Tractor Stores Ice for Summer—An Interstate tractor, owned by J. A. Camren, Taylor, Mo., was used successfully to furnish power for the endless chain system of storing ice at the Louis Pottle Icehouse at Quincy, Ill. A belt was connected with the hoisting chutes and the cakes of the congealed product directed into the various compartments of the house desired. Mr. Camren has utilized his tractor in pulling up stumps, grading roads and plowing and cultivating his land and also considerable of that of his neighbors. Understanding its operation thoroughly, he has never experienced any trouble of consequence and is, as a result, one of the most enthusiastic tractor boosters in all Missouri.

Yet They Blame Motor Vehicles—Who'd a thunk it? Motorists are not the careless users of the highways—at least in Massachusetts. Take it from the Industrial Accident Board, that knows all about accidents. In its report just made to the state officials it says horse-drawn vehicles caused more deaths in Massachusetts during the last year than motor-driven vehicles. The number of fatal accidents caused by horses exceeds by three the number of similar accidents caused by all classes of motor vehicles in spite of the fact that motor cars and trucks exceed by 50 per cent the number of horses in the state. Yes, siree. There were forty-three fatal accidents reported to the board, of which twenty-three were horse-driven and twenty motor-driven.

Headlight Law Loses on Technicality—Iowa's headlight law passed by the last legislature has been knocked out by the supreme court of the state. The decision which killed the law was made in the case against C. F. Claiborne, a Des Moines garage owner charged with operating a motor car without proper lights. The intention of the law was to prohibit a headlight from throwing a beam of light more than 42 in. above the ground at a point 75 ft. in front of the car. However, when the Iowa senate made an amendment to the original bill the word "not" was omitted so that the bill as passed provided for the beams of light being thrown more than 42 in. above the ground. The case against Mr. Claiborne was brought as a test case by Des Moines motorists, and the district court decision several months ago was the same as the higher court has now made.